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# Priority Health Problems in the Education of Health Professionals

Victor Neufeld
Richard Pickering
Janice Simpson

**Editors**

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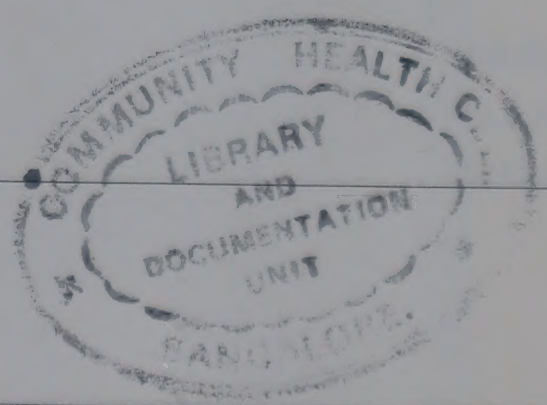


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Dedication to

## Michael A. Adedoyin

This book is dedicated to the memory of Dr. Michael A. Adedoyin, a writer of one of the chapters and a colleague of many of us involved in the development of the priority health problems model.

Mike Adedoyin was a Nigerian pediatrician, who qualified in Medicine from the University of Ibadan, and obtained post-graduate training in Pediatrics in the United States and Canada. He completed a Master's degree in health research methods at McMaster University, before returning home to Nigeria and joining the faculty at the University of Ilorin in 1979.

It was there that he made many outstanding contributions in both the clinical and the educational areas. As a pediatric clinician and researcher, he established several clinics - in sickle-cell anemia, nutrition and gastroenterology. He also assisted in the development of the Neonatal Unit at the Teaching Hospital. As an educator, he was the Co-ordinator of the Community-based Experience and Service (COBES) program.

It was through his work in community-based education that Mike Adedoyin was designated as the representative of the University of Ilorin on the Network Task Force: "Priority Health Problems in Medical Education." He was an active member of the team of international fellows that developed the PHP model, tested it in his own institution, and contributed to the further refinement of the model.

Those of us who worked with him over several years remember him best for his gentleness, his irrepressible optimism, his ability to listen to his colleagues with interest and great perception, and his dedication to his own country and people. He was highly respected among his peers in Nigeria; through his participation in many meetings of the Network of Community-Oriented Educational Institutions for Health Sciences, he is also remembered by colleagues around the world.

Mike Adedoyin passed away on the fourth of December, 1994 after a brief illness with a malignant condition. He is survived by his wife Evelyn and his four children - three daughters and a son.

We are honoured to be able to dedicate this book to his memory.

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# Acknowledgements


## Editors

Victor Neufeld, M.D.
Faculty of Health Sciences
McMaster University, Canada

Richard Pickering, M.D.
Hamilton, Canada

Janice Simpson, Ph.D.
Hamilton, Canada

## Submissions contributed by

E. Abd-Allah, M.D.
Faculty of Medicine
Suez Canal University, Egypt

Michael Adedoyin, M.D.
Faculty of Health Sciences
University of Ilorin, Nigeria

Heather M. Arthur, Ph.D.
Faculty of Health Sciences
McMaster University, Canada

Larry Chambers, Ph.D.
Faculty of Health Sciences
McMaster University, Canada

Pisonti Chongtrakul, M.D.
Faculty of Medicine
Chulalongkorn University, Thailand

S. Hosny, M.D., Ph.D.
Faculty of Medicine
Suez Canal University, Egypt

Rosemary Jaworsky, M.A.
McMaster University, Canada

L. Makhlouf, M.D., Ph.D.
Faculty of Medicine
Suez Canal University, Egypt

F. Maklady, M.D., MRCP
Faculty of Medicine
Suez Canal University, Egypt

Rossi Sanusi, M.D., Ph.D.
Faculty of Medicine
Gadjah Mada University, Indonesia

Wagdy Taalat, M.D., Ph.D.
Faculty of Medicine
Suez Canal University, Egypt

## Reviewers

Chitr Sittiamorn, M.D., Ph.D.
College of Public Health
Chulalongkorn University, Thailand

Funsho Komolafe, M.D.
Faculty of Health Sciences
University of Ilorin, Nigeria

Ron McAuley, M.D.
Faculty of Health Sciences
McMaster University, Canada

Una Reid, Ph.D.
Pan American Health Organization
Bridgetown, Barbados

# Foreword

Changing the curriculum in schools for health professionals is said to be harder than moving a cemetery. There are even those who say that contemporary curriculum planning in many such institutions is more akin to group mud-wrestling - occasionally without the mud. Seniority, fast talking, shroud waving and threats that "people will die" are not the most constructive ingredients for deciding how curriculum content and time are assigned. The task of the curriculum committee is to determine how best to prepare cadres of health professionals who can respond appropriately to the population's individual and collective health problems. The task is not to enhance the prestige or power of faculty members of their departments. As Oscar Wilde reminded us: "Nothing worth learning can be taught!"

Many leaders in industry, commerce and other major endeavours would characterize "curriculum roulette" as it is played in too many educational institutions for health professionals as the joke it has become. Not even a dog-food producer would think of launching a new enterprise without ascertaining the nature and extent of the market. Yet that is precisely what the health care "industry" does as it undertakes society's largest expenditure, apart from defense.

The elements of successful management include efficient and effective deployment of all the organization's resources to achieve desirable and explicit goals. This, above all, includes selecting and training personnel for their jobs. For a health professional school, one of the highest priorities among its goals should be given to the preparation of appropriate mixes of generalists, specialists and sub-specialists of all types and competencies to respond to the health problems of the populations to be served. How many cardiac surgeons are needed per 100,000 population? How many bedside nurses? How many village health workers? That, however, is not the way most curriculum committees are used to thinking.

This land-mark monograph demonstrates clearly that the dysfunctional practices that have dominated curriculum development in the past can be changed, although change is far from easy. The authors have shown that different ways of thinking about educational priorities with different kinds of information are viable substitutes for the old patterns. What follows then are six concrete examples, not of specific curriculums, but of new ways in which each of these selected faculties has gone about constructing its students' learning experiences.

How are priorities among the population's health problems best established? What kinds of information might the faculty reasonably consider as it sets about establishing its educational priorities? In approaching its task, the faculty should employ the same kinds of information and thought processes in creating the curriculum that it hopes to inculcate in its students as they think about their future practices. Education, after all, is about

learning to think, to solve problems, to obtain information, and, especially, to evaluate its credibility. It is not about coping with mountains of transient "facts" or listening to "experts" dilate on their own particular interests.

A number of approaches are documented in the following chapters, but all seem to suffer from one or more flaws. For these faculties, available rates of "diseases" and deaths usually were inadequate for setting educational priorities. In contrast to the priorities of many faculty members, the people who do the suffering and pay the bills want their immediate problems addressed in timely fashion. Documenting the problems of the living, in their minds, takes priority over counting the dead and their troubles.

There is a world-wide paucity of useful information available about current illnesses and suffering, in contrast to the abundance of data based on diagnostic labels - mostly in Latin or Greek - devised over the centuries by physicians and biologists of diverse persuasions. In spite of limitations imposed by the diagnostic disease labels, it is gratifying to learn how well the institutions represented in this volume have coped. Creatively, they have generated "information" from "data," and, in turn, "intelligence" from that "information." It is the intelligence from the original data that has guided the setting of health priorities for the education of physicians and nurses in these six examples.

The examples described in this volume make it apparent that we have all too few nomenclatures, classifications and coding systems based on the language of patients. These should be stated in lay terms based on local, national, or regional cultural, linguistic and traditional usages modified by expressions of pain, functional impairment and anxiety. Exactly what are the community's most pressing problems expressed as days in pain, days lost from work or school, and days on medications? Terms and classifications to express severity, urgency, chronicity, recurrence and association with apprehension or fear also are needed urgently. We are indebted to an astute observer of the passing scene to express the problem in a pithy fashion. Professor Finagle left us the following message:

> The information you have is not the information you want!
> The information you want is not the information you need!
> The information you need is not available from the data you have!

One new ingredient in these six stunning case histories from a wide variety of venues is each faculty's enhanced concern with the "community" it serves. But what does it mean to be "community oriented?" There are substantial differences between the concepts and definitions of community" and "population." To be "community oriented" is not synonymous with using "population-based" information. The latter is required in setting health priorities and making health policies - in this instance, educational policies. A community orientation for health professional schools increasingly is important politically and

socially, but population-based thinking is a central feature of scientific and epidemiological concepts and methods. Population-based constructs involve both numerators and denominators. The former are described by various explicit attributes, and are sub-sets of the latter. The denominator, in turn, is defined as all of the residents living in a geo-political jurisdiction, or occasionally by enrollment in a health care plan or insurance scheme, for example. To compare experiences over time and place, rates are calculated that are based on clearly defined numerators and denominators, suitable adjusted. A defined population is the denominator, not just a vague expression of community orientation.

The population perspective is important, but so are the clinical and the molecular perspectives. One is not "good" or "bad," "right" or "wrong." Each has its appropriate place as a site for investigation, care and policy-making. All three need understanding and appreciation in educational settings; balance is essential. The questions being asked or the educational experience to be provided should determine the venue for consideration.

Of the three perspectives for understanding and ameliorating both individual and collective health problems, however, it is the population perspective that has been neglected most in recent decades. And it is this perspective that those involved in the six academic exercises described in this volume have sought to restore. Population-based thinking is essentially epidemiological thinking. But that does not imply that all health professionals or even more health professionals should become epidemiologists. What is needed is more epidemiological or population-based thinking throughout the entire health care enterprise, if the community's health problems are to be identified, counted, measured, and factored into thinking about priorities for the education of health professionals. How else can a curriculum be constructed rationally?

The six examples provided in this volume demonstrate concretely how greater rationality can be employed in developing priorities for the educational experiences of health professionals who are prepared to respond to the health problems of the communities they serve. Much more is needed in both developed and developing environments, but this volume gets us started.

Kerr L. White, M.D.
Charlottesville, Virginia, U.S.A.

# Introduction
# Task Force 2 and Beyond

## Purpose of the Monograph

This monograph documents the recent experience of six medical schools or faculties of health sciences, located in different parts of the world, in health problem prioritization and curriculum reform. Its underlying assumption is that the design of education programs for health professionals must reflect the priority health needs of the communities that the educational institutions serve. It also assumes that the sharing of case studies illustrating how practical tools and approaches have worked in a variety of local circumstances will help speed the process of health professional education reform around the world.

## Background: Task Force 2 and the Need to Document Practical Experience

In 1984, the medical schools or health sciences faculties of six universities in six countries (located in Africa, Asia, Europe and North America) were brought together by the *Network of Community-Oriented Educational Institutions for Health Sciences* to form a task force on "Priority Health Problems in Medical Education."[1] The goals of "Task Force 2" or "TF2", as it became known (to distinguish it from six other task forces on issues in medical education established by the *Network* ), were:

- to develop analytic tools to help the faculty of health sciences in educational institutions identify the major health problems of the region served by them, and to display these in a prioritized, scientifically valid and understandable fashion;
- to develop strategies for incorporating this analysis of priority health problems into the curricula of medical schools.

Representatives of the six institutions - McMaster University in Canada, Suez Canal University in Egypt, University of Tampere in Finland, Gadjah Mada University in Indonesia, University of Ilorin in Nigeria, and Chulalongkorn University in Thailand - met as a group in 1985 to discuss goals and lay the groundwork for five years of collaborative work. Over this period, each institutional team carried out practical experiments with implementing a "priority health problems" (PHP) approach to curriculum development in their home institution. This local work was interspersed with study blocks at McMaster University, during which teams shared what they were learning through experience, and developed their theoretical knowledge. Workshops focused on:

- analytical skills and methods for critically appraising health data and assessing the burden of illness in communities;
- principles of planning professional education and curriculum development; and
- the development of a framework for incorporating PHP analysis into medical curricula.

[1] Task Force 2 received funding from the International Development Research Centre, the Rockefeller Foundation, and the Canadian International Development Agency.

In a 1990 report published by the International Development Research Centre (entitled *Priority Health Problems in Medical Education*), the participating institutions outlined the results of their activities, articulated generic "lessons learned" that they felt could be of value to others, and identified the next steps in their ongoing PHP-based curriculum change. While the widely differing local contexts meant that each institution's experience of moving toward a PHP model was unique, the TF2 team captured the essence of their shared philosophy and approach in a simple "Priority Health Problems Model" schematic (see Fig. 1).

The team also produced a bibliography of literature relevant to the task force's goals. Those working on this aspect of the TF2 project found that while there was a wealth of information available on methods and the implementation of strategies for identifying priorities in general, there was very little in the way of documented applications of priority-establishing methods for medical education, or even for more broadly defined health sciences education.

A follow-up literature review carried out in 1994 indicates that no significant documentation related to priority-establishing methods in health sciences education has emerged in the intervening years. There is a growing body of writing that looks at various aspects of systematic health problem prioritization in the context of health service delivery decision-making: determination of data needs, data collection and management, analysis for the purpose of policy formulation or prioritization.

Recently, the process of setting priorities in the area of health research has also begun to receive attention. In 1990, a major report entitled *Health Research: Essential Link to Equity in Development* was released by an independent commission. The report exposed the anomaly that while most of the global expenditure for health research is in the "North," most of the problems that require health research are in the "South." Among other recommendations, the report urged every country in the world to consider implementing a program of "essential national health research" (ENHR), where national research priorities could be matched to the resources available in that country to conduct the research. The report launched a series of task forces and country initiatives that culminated in the creation of the Geneva-based Council on Health Research for Development (COHRED). COHRED is working in various parts of the world to facilitate the determination of health research priorities, leading to a national health research program. Working with the researchers in the priority-setting process are policy-makers and members of the community.

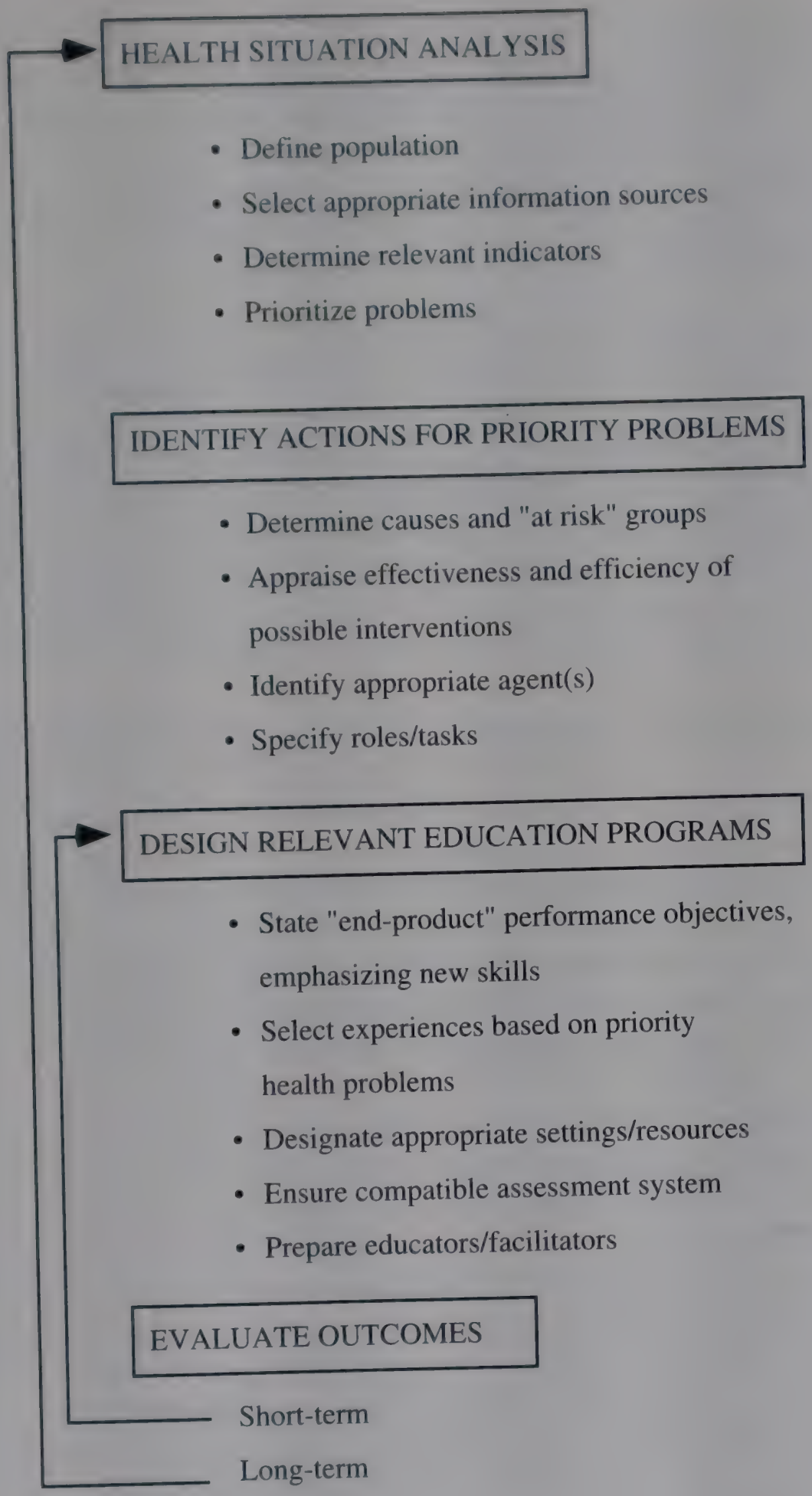
HEALTH SITUATION ANALYSIS
• Define population
• Select appropriate information sources
• Determine relevant indicators
• Prioritize problems
IDENTIFY ACTIONS FOR PRIORITY PROBLEMS
• Determine causes and "at risk" groups
• Appraise effectiveness and efficiency of possible interventions
• Identify appropriate agent(s)
• Specify roles/tasks
DESIGN RELEVANT EDUCATION PROGRAMS
• State "end-product" performance objectives, emphasizing new skills
• Select experiences based on priority health problems
• Designate appropriate settings/resources
• Ensure compatible assessment system
• Prepare educators/facilitators
EVALUATE OUTCOMES
Short-term
Long-term

Figure 1. Priority health problems model

Very little of the emerging work, however, has a specific focus on the education of health professionals.[2] This is a serious gap. There is currently much philosophical debate over the role of health professional education in general and a gradually changing vision of the ideal relationships among educational institutions, health service delivery mechanisms and the community. In this context, there is a need for practical case studies of institutional change, as well as proven tools and processes that can be adapted to support such change in widely varying local circumstances.

In 1994 the *Network* and the W.K. Kellogg Foundation, as part of their joint "Community-Partnerships" initiative, invited five of the six original TF2 participants[3] to take another look at what they have learned through the initial project activities and their continuing efforts to build on this work through the early 1990s. The Kellogg Foundation provided generous funding for the task. This monograph documents the experience of the TF2 participants, draws some general conclusions, and suggests directions for future research and documentation activities. It glances briefly at the findings of the literature survey, and includes a selected annotated bibliography of resources that will be of interest to those involved in planning PHP-based curriculum change (Appendix A).

## Philosophical Underpinnings: The Focus on "Needs-Based" Education

TF2 members share with their *Network* colleagues the conviction that health sciences educational institutions have a responsibility to ensure that the concepts and content of their educational programs reflect the health needs of the communities they serve.

This is what has become known (after Kerr White) as "demand-side" thinking, in contrast to the more traditional "supply-side" thinking. The demand-side approach, as described by Neufeld et al (1993), begins with an analysis of needs, expectations and trends:

> *The kinds of questions that inform this perspective are: What is the health status of a given population or jurisdiction? What are the health problems that need to be addressed? Which are the most important? What are their causes? Which interventions (preventive, therapeutic, rehabilitative or palliative) have been scientifically shown to do more good than harm and are available at reasonable cost? What are the distinctive roles for physicians in administering these interventions? Which interventions are better performed by other health care workers? The sources of information available to address these questions are many and varied and include policy documents and reports, health-data analyses and other quantitative studies of health and its determinants (and of the health care system), and consumer surveys.*

[2] This monograph will concentrate on medical education, because that is where the experience of TF2 members lies in large part. We believe, however, that much of this material will be applicable to the education of other health professionals as well. The monograph includes one case study documenting the adaptation of PHP concepts in a school of nursing.

[3] Tampere University withdrew in 1987, having fulfilled its goals.

Curriculum planners then use this data to develop educational modules that focus on priority medical conditions and cost-effective interventions.

Traditionally, however, medical education (and the education of all health professionals to some degree) has been driven by "supply-side thinking" - strongly influenced by the availability of new knowledge and technology. In an era in which we talk about an "information explosion" in all fields, but particularly in the sciences, the supply-side approach results in

> *...highly scheduled and crowded curricula with relatively little time for independent thinking and learning by students, in battles among specialty groups and departments for curriculum hours and in excessive dependence on fact-oriented lectures as the predominant method of teaching. Lectures, even in a single course, are often given by many different people, all speaking only about their own areas of expertise. Some have referred to this phenomenon as the "parade of stars."*

The intention of this model is not to set up an "either/or" dichotomy, but rather to make the argument that the balance of thinking in medical education has been skewed to the supply side and needs to be redressed (see Fig. 2).

This is not a new idea. Some of the younger institutions of health professions education, beginning in the late 1960s, have been oriented to reflecting community needs from the outset. In 1979, a group of health sciences educators from various countries met in Kingston, Jamaica to talk about their common interest in a community-oriented approach to educating health professionals. This group, with the support of the World Health Organization and the Pan-American Health Organization, inaugurated the *Network of Community-Oriented Educational Institutions for Health Sciences*. The general aim of the *Network* , which now has 58 full member institutions as well as 135 associate members and 64 corresponding members, is to provide mutual support to member institutions who wish to adapt their curricula to the health needs of the communities which they serve. Its five primary objectives are:

- strengthening membership institutions in their implementation of community-oriented learning and appropriate instructional methods;
- strengthening faculty competencies related to community-based education;
- developing techniques, approaches, methods and tools appropriate to a community-oriented curriculum (such as problem-based learning);
- promoting population concepts in the health services system and the curriculum;
- assisting institutions in countries that have decided to introduce innovations in the training of health personnel, with the ultimate goal to improve health care and to contribute to the achievement of "Health for All."

The worldwide movement popularly known as "Health for All by the Year 2000" was launched at the 1978 World Health Organization/UNICEF conference in Alma Ata, U.S.S.R. Through the 1980s, a number of national and international initiatives - like the *Network's* TF2 project - were put in place, with a goal of bringing about fundamental change in the way health is perceived, promoted, and protected. By 1994 - as even the richest countries found health costs spiralling out of their reach, while some of the poorest countries struggled with new challenges such as the AIDS pandemic - the level of public debate about health, the role of the health system, and the responsibility of educational institutions had grown considerably in both the scholarly literature and the popular media.

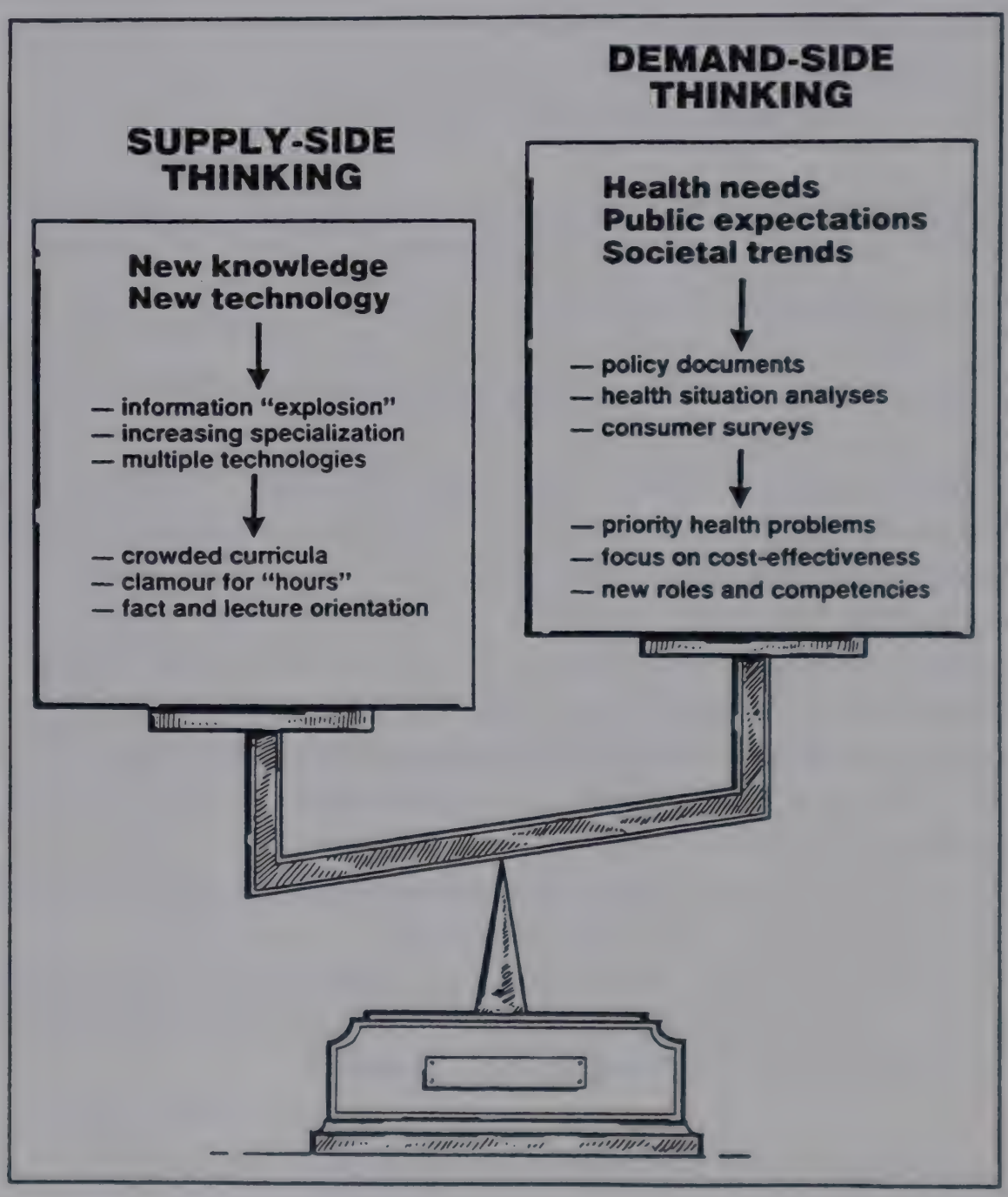


Figure 2. The supply-demand balance in medical education

The updated literature review carried out for TF2 participating institutions in 1994 indicated a need for a broader understanding of health (moving beyond mechanistic models of causal relationships among sickness, interventions and care), and a growing recognition of the effect of social, political, economic and environmental factors on health and health care. Researchers have explored the complex relationship between economic realities and the health status of a population, and the detrimental impact of governmental policies such as those that result in war or trade embargoes. They have argued, for example, that poor transportation systems may have a direct impact on health care by constraining access to available services. They have pointed out that people living in a context of overwhelming environmental detractors to health (such as contaminated water supplies), are less likely to see the value of health services.

In this context, there is a clear call for more intersectoral collaboration to maximize limited resources. The design of health-related information systems is a case in point that is explored in the literature from a variety of angles. Can systems be set up so as to meet the needs of the variety of organizations involved in health promotion, health protection and health services delivery? Can medical educators work with health services management researchers in such a way that all stakeholders benefit from the relationship? Can mechanisms be put in place whereby these organizations then work together in setting priorities and goals, in determining joint action, and in improving management and other skills to increase the effectiveness of local health systems? Is there a special role for medical educators to play in ensuring that the needs of underserved groups with little political power are considered when health problems are being identified or interventions planned? How can they work more closely with service providers/policy-makers to accomplish this? Can they build on their unique links with communities (through student placements, clinical teaching units, teaching hospitals, etc.)?

Gradually, the medical profession is acknowledging the need for change: change in their relationships with policy makers and health services providers, in the way they practice medicine in their communities, and in the way students are prepared for practice. Despite strong external pressures to move rapidly toward reform, however, there is little evidence that substantive change is taking place. A longitudinal survey of medical schools in the U.S. and Canada, for example, showed that there had been no change from the early 1980s to the early 1990s in the guiding philosophy of medical education (Brownell Anderson, 1993). Barriers to change cited in the literature include national and regional economic and political problems; the historical lack of relationships among medical schools and health services; the inherent difficulty of changing the beliefs, attitudes and behaviours of individuals associated with academic institutions, and of reshaping the mission and power structure of the medical schools.

On the other hand, there have been some positive developments - among them the emergence of collaborative partnerships that allow institutions to maximize their resources

and support each other in attaining community-oriented goals. Examples include the University Partnership in Essential Health Research (UPIEHR), the International Clinical Epidemiology Network (INCLEN), the Health of the Public Project in Canada and the U.S., as well as the *Network of Community-Oriented Educational Institutions for Health Sciences* described earlier.

A recent experiment in the Canadian province of Ontario may serve as a useful model of an inter-institutional partnership aimed at facilitating the development of institutional mechanisms to support ongoing education reform within one geo-political jurisdiction. The "Educating Future Physicians for Ontario" (EFPO) project brings the five medical education institutions in the province together in a joint effort to "modify the character of medical education in Ontario to make it more responsive to the evolving needs of Ontario society." The catalyst for the project was the offer of funding from a not-for-profit organization called Associated Medical Services (AMS). The Ontario Ministry of Health also funds and supports the project.

In the first phase, an EFPO working group set out to define the health requirements of Ontario society as they relate to the training of physicians. In addition to surveying the scientific literature and analyzing health data from various sources, the group gathered qualitative and anecdotal information from a cross-section of health care consumers, as well as educational planners, health care professionals and medical students. Their findings indicated that the Ontario public expects physicians to play a wide range of roles, including:

- "medical expert/clinical decision maker," well informed about the science and technology of medicine;
- "communicator/educator/ humanist/healer," someone who truly cares for the patient, and can communicate that caring;
- "collaborator," working in teams with other health professionals as part of a larger social system;
- "health advocate," aware of all determinants of health, and actively influencing public policy in "healthy" directions.

Their analysis suggested a need for educational institutions to increase the interaction of students with the community and with the wider social system, to broaden the context of the students' training to include an understanding of how their own work interacts with other disciplines, and to emphasize problem-solving and self-directed learning skills (EFPO 1993).

EFPO working groups are now focusing on the following objectives:

- To foster faculty development to meet the expanded needs of medical education, including curriculum change, problem solving, clinical epidemiology and continuing medical education.

- To develop a mechanism for the evaluation of medical students that will assess both knowledge and competence.
- To support the development of educational programs for medical students in Ontario that are based on meeting defined societal needs.
- To generate a mechanism and process for the development of leadership in medical education that will be able to sustain changes initiated by the project.
- To establish community/medical school partnerships.

The project is focused on implementation rather than on recommendation, and the ideas and activities it generates are closely integrated with the curriculum renewal and change activities underway in the five participating institutions. At the same time, however, it takes a long-term view, looking to support the development of systems that monitor the need for continuing change and the creation of strategies for effecting these changes. While the actual process of change looks very different at each institution, the collaborative model is proving an effective means of accelerating successful reform.

## TF2: Prioritizing Problems for Curriculum Change

While the scope of the TF2 collaboration was broader in geographic terms than the EFPO project, its specific focus was somewhat narrower. TF2 concentrated on the challenge of determining which health problems in the community are priorities, and then designing processes to ensure that curricula of individual institutions reflect these priorities. It is clear from the institutional stories documented in this monograph that even when institutions share a philosophical approach and a conceptual model, the actual experience of implementing the model varies widely in different local contexts.

Each institutional team involved in the writing of these case studies was given the same mandate - to write a description of recent activities in their institutions growing out of the original TF2 work, highlighting practical lessons learned and obstacles to be overcome. Each proceeded with the task independently of the other teams. Many themes overlap: the difficulties of obtaining and analyzing relevant data, the usefulness and limitations of mathematical formulae or "prioritization schema" in translating raw data into priority problems, the importance of considering both quantitative and qualitative data, the preference for using problem-based learning approaches in curriculum development. At the same time, each institutional story highlights different and particular points of interest.[4]

### *Obtaining Data*

Three of the institutional stories highlight different aspects of the data collection problem. The challenge of obtaining current, comprehensive and relevant data is a major theme in

[4] The stories submitted by the institutions have been edited for clarity. Attempts have been made by the editorial team to retain the original approach and voice of the submission.

the literature. The fact that there is no one ideal system of disease nomenclature to guide researchers gathering and reporting health data exacerbates the difficulty, as available information from one source often cannot be easily integrated or compared with data from other sources. Encouraging progress is now being made in the development of classification systems; the International Classification of Primary Care (ICPC) system is a prime example.

The shortage of biostatisticians and epidemiologists trained to work under the difficult conditions of the so-called "developing" countries of the South has been cited as a major factor contributing to the disappointing results of interventions against tropical diseases, despite strong advances in tropical disease research. Some of the authors surveyed in the literature explore creative methods for using international, national and other data to compensate for the lack of appropriate data at the local level. One suggests, for example, making a shift from considering clinical encounters as a context for health service delivery only, to considering them as opportunities to gather data for epidemiological and health service planning purposes. Others describe methods for combining and comparing medical tests across studies or strata which are particularly useful for schools collecting data from remote sites.

At Gadjah Mada University (Indonesia), the establishment of a telecommunications network linking the institution with sixteen district health centres and field hospitals turned out to be a key component of data collection activities. Prior to the implementation of the network, all health data collected in the field was channelled to a central unit in Jakarta, where it was rolled up with data from other parts of the country and eventually sent back to the university in aggregate form. The network gave Gadjah Mada direct access to current information specific to the area it serves. A corollary benefit turned out to be the telecommunications network's capacity - through computerized teleconferencing - to facilitate communication among these parties on how to address the priority health problems identified.

At McMaster University (Canada), the establishment of a "Health Priorities Analysis Unit" (HPAU) has also had the effect of linking the university more closely with health policy makers, health delivery services, and a wide range of community groups. The HPAU acts as an "intelligence unit" - developing community health indicators which have relevance in education, research and service, and monitoring health status in the regional municipality of Hamilton-Wentworth. While the original intention was to gather quantitative and qualitative information to use in the planning of medical education, HPAU is now also translating the raw data into formats that are of practical use to the wide variety of groups involved in targeted health-related community interventions. The "health intelligence unit" model is proving to be a useful mechanism for building local capacity to gather, analyze and interpret health information. There is experience indicating that the health intelligence unit will be able to facilitate both the formulation of policy that is sensitive to

community health needs, and the mobilization of private and public resources to meet these needs. It also frees educational planners from the task of collecting and synthesizing information, and allows them to focus on actually applying it to curriculum planning activities.

Some recent articles describe methods for collecting and analyzing data that can be used by individuals with little statistical expertise. In their submission to this monograph, the University of Ilorin (Nigeria) team describe their own experiments in using medical students to collect data in the community. This approach enables the students to gain first-hand anecdotal knowledge of community realities and priorities, while also contributing to the collection of comprehensive community data on which to base PHP curricula.

***Using Data to Prioritize Health Problems***

A second major theme of the institutional stories is approaches to using the available data to quantify and prioritize health problems. Chulalongkorn University's (Thailand) account focuses on the Task Force 2 efforts to move beyond a "ten-leading-causes-of-death" approach to determining priorities, to consider various factors that assess the quality of health. The "Burden of Illness" index first described by MacDonald et al (1989 - see Appendix B) reflects the importance of behavioural, social and cultural factors influencing the burden of illness in a community, while encouraging a systematic and scientific approach to prioritization. The Chulalongkorn story shows how a version of this formula, adapted to the local setting, contributed to a process of curriculum reform.

A second story from McMaster University describes how this analytic tool has been adapted and successfully applied to the planning of one component of a nursing curricula. The nursing group's account also stresses the importance of integrating quantitative and qualitative data in health problem prioritization processes. The literature is increasingly recognizing the usefulness of incorporating qualitative factors into quantitative scoring systems, especially in dealing with the "severity" factor. In many areas, the judgements of people who are not medical experts are at least as important as those of the experts - peoples' perceptions of their own pain and suffering, for example, should be factored into any measurement of "severity." The raw data considered by McMaster's nursing faculty included professional and public opinion (government statements, community surveys, expert consultation), including information on societal values, changing ethical and legal priorities and professional expectations - as well as epidemiological data, demographic and technological trend analyses.

***Building PHP Information into Curricula***

Once health problems have been prioritized, the next challenge is to ensure that curricula reflect these priorities. This stage receives the least attention in the institutional stories, possibly because most of them are still very closely involved in implementing these changes. Suez Canal University's (Egypt) submission talks most directly of the technical

process of incorporating top priority problems into a problem-based curriculum (as opposed to a traditional curriculum structured according to discrete disciplines). They were assisted in this task by a computer program capable of extracting and itemizing discipline content from a problem-structured curriculum, and of mapping where and how many times priority problems were touched upon in a spiralling curriculum.

The "softer" issues of curriculum change - issues of initiating change processes within a large institution, reaching consensus, obtaining faculty buy-in and so on - are not addressed in detail here. Clearly, these are key areas of PHP implementation that deserve to be treated at length in subsequent work.

## Chapter One: The Role of Health Information Management and Communication: Experience from Indonesia

Gadjah Mada University


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# The Role of Health Information Management and Communication: Experience from Indonesia

Gadjah Mada University

## Introduction

During the Task Force 2 study blocks, it became clear that in order to meet the Task Force objectives, most institutions would need to substantially improve their ability - and the ability of health personnel in their region - to gather, analyze, use and communicate health-related information. In Yogyakarta, Indonesia, this realization grew into a plan to establish a health information unit in the Faculty of Medicine of Gadjah Mada University.

The resulting "Health Priorities Analysis Unit" was designed both to contribute maximally to the health of the community by improving local data management and health systems planning, and to better prepare health professionals to meet the health needs of the communities they will serve. It accomplishes this by:

- training health personnel at the sub-district, district and provincial levels in data collection, handling, assessment, interpretation, and use in program planning;
- serving as an information resource centre - obtaining, analyzing and interpreting health data, and disseminating it to faculty members and health personnel in a variety of formats;
- assisting faculty members of health professions educational institutions in obtaining relevant data and using it for curriculum planning;
- assisting health personnel and faculty members in using health data for research.

In order to enhance communication among the university, the community and the government, the project included education and training in the practical use of computers, and the development of a computer telecommunication network. This submission describes the achievements of the project, and highlights the contribution of the telecommunication network in facilitating information access and exchange.

## People Development and Relationship-Building

The Health Priorities Analysis Unit or HPAU was established in 1990, with the participation of several groups and departments within the Gadjah Mada University (GMU) Faculty of Medicine, four district health centres, five departments of health, a district hospital, and a field research post (see Table I for a list of participating organizations).

Table I. Participating groups

**GMU Faculty of Medicine**

- Community Oriented Medical Education Program*
- Department of Pediatrics
- Clinical Epidemiology and Biostatistics Unit*
- Clinical Pharmacology Department*
- Child Health Department*
- Dr. Sardjito Hospital Medical Records Unit*
- GMU Computer Centre*

**District Health Centres**

- Delanggu*
- Megalang
- Grabag*
- Getasan*

**Department of Health Units (District Health Offices)**

- Central Java Province*
- Yogyakarta Province*
- Klaten District*
- Megalang District*
- Wonogiri District*

**Other Groups**

- Wonogiri Hospital*
- Purworejo Field Research Post*

* Asterisk denotes sites linked to the computer communications system via radio.

In the early stages, the focus was on establishing infrastructure for communication, consultation, conferencing and distance learning. The development of a core group of people with skills in information management, priority analysis and program planning was one major thrust.

To that end, four GMU faculty members (from a variety of disciplines) went to McMaster University in Canada for a period of six months each to study a range of topics, including

epidemiology and biostatistics, measurement of community health (data analysis, interpretation and methods of presentation), strategies for identification of health priorities, health policy, and computer skills (use of statistics software, word-processing, electronic mail and computer conferencing). Each participant was asked to prepare a proposal outlining the application of newly acquired skills on his/her return to Indonesia.

Three of these faculty members have been very active in implementing project activities both within the University and in the surrounding community, including contributing to the education of students and other faculty members in the area of health information management. For example:

- A health centre physician in Puskesmas Salam in Megalang District (also a GMU faculty member) has made major contributions to the project. Her exemplary application of her professional experience plus the knowledge gained during her McMaster studies - particularly in organizing, analyzing and communicating health data - will be touched on later in this report. She has also taught the concepts of Health Information Management to undergraduate students in the School of Medicine and to postgraduate students in Public Health.

- A member of the Department of Pediatrics at GMU has been active in implementing the use of the computer communications network in education, and the use of information in clinical decision-making at the Sardjito Teaching Hospital. He has given weekly case presentations and participated in at least nine computer network conferences on specific topics of contemporary interest. These conferences have increased the intensity of interdepartmental discussion and consultation. This faculty member has also served as an HPAU facilitator for GMU staff.

- A faculty member with a major interest in medical education has been involved in introducing the problem-based, small group learning program into the GMU undergraduate medical curriculum. This component of the curriculum includes modules on community health and health priorities concepts. She has also been a contributor to the Health Priorities Bulletin (described later in this submission).

At the time of writing, four other GMU faculty members, the library staff, and members of at least three other research and service groups had enhanced their knowledge and skills in health information management and health priorities analysis through the project.

Approximately twenty health personnel at nine district or sub-district locations were trained in health information management, including methods of data collection, data analysis/interpretation, health priority identification, and utilization of health information for planning and resource allocation.

The HPAU provides ongoing education for health professionals in the health centres, hospitals and district health offices, using a participatory continuing education approach. Through problem-based learning sessions, computer networking and other HPAU communication vehicles, community-based health personnel have been assisted in developing techniques of information management, priority analysis, problem-solving and program evaluation.

Establishing strong collaborative relationships between sub-district health personnel and village development centres - so that priority setting and problem-solving is a joint health centre/community venture - is another priority of the HPAU. To cite one example of activity in this area: village Cadres collect monthly infant and maternal health data, which is used by the health centre to determine who will be scheduled for immunization during the next month. These cooperatively prepared data sets make planning of immunization more efficient. Health centre staff can make accurate determinations of how many doses of vaccine will be required at the village site each month, thus ensuring the effective use of available vaccine.

## The Telecommunication Network

Another major activity has been the establishment of a radio-linked computer telecommunication infrastructure to support information exchange, ongoing education and reporting. By the end of the funded project, the telecommunication network included nineteen computer communication terminals at sixteen sites in central Java[1], linked by radio. The system consists of a central system unit at the HPAU site, and multiple peripheral terminals. Each terminal site has a person responsible for operations, and is set up with a computer, monitor, printer, radio transceiver, modem, booster, power set, and antenna. Communication can occur between the central terminal and any or all peripheral terminals, as well as between individual peripheral terminals. The system uses a radio network that is more reliable than the regular telephone lines.

By facilitating fast and efficient exchange of information, the network supports a broad range of HPAU objectives and activities. Prior to the implementation of the network, all health data collected in the field was channelled to a central unit in Jakarta, where it was rolled up with data from other parts of the country and eventually sent back to the university in aggregate form. The network now gives faculty curriculum planners direct access to current information specific to the area served by the university. It supports continuing education programs such as the Department of Pharmacology's program for prescribers and health managers, which includes teleconferences on drugs and therapeutics, and utilization review and feedback of drug use patterns for prescribers. It also encourages communication among the various partners in the network on how to address the priority

[1] These sites are identified by an asterisk (*) in the list of participating groups in Table I.

health problems identified. An evaluation of the network documented some of the ways in which it is being put to use:

- From **Delanggu Health Centre - An Early Warning System :** "Delanggu Health Centre has used HPAU radio-computer network for daily reporting of specific diseases to the District Health Office in Klaten. The advantage of this system is that data can be transmitted in a standard form and quickly. Since information is in a written form, data and ideas related to cases reported may serve as first hand input to health authorities involved in policy-making. Through the network, direct consultation between staff at the health centre and staff at higher levels can be done with better accuracy and less formality."

- From **Grabag Health Centre - Medical Consultation**: "The HPAU radio-computer network has been an effective medical consultation medium in response to critical and difficult cases. It has enabled health centre staff to communicate with specialists in Sardjito Hospital and the School of Medicine's Task Forces. As a result, resources can be saved through this network - patients can have appropriate care in the health centre without having to go to hospital, and transportation costs can be minimized."

- From **Salam Health Centre - Continuing Education:** "Since 1990, several classical training events for Ministry of Health (MOH) staff have been undertaken to improve the quality of health care in the district of Megalang....With this network, distant conferences and consultations as continuing education become less formal. Health centre staff can be involved actively as teachers and learners....The advantages of this system for the MOH are flexible organization of course scheduling, effective use of university staff as resource persons, and greater opportunity to discuss the ongoing case study raised from the field with university experts."

- From **Sardjito Hospital - Continuing Education:** "Sardjito Hospital has put sets of radio-computers in the major departments: Emergency Care, Internal Medicine, Pediatrics, Obstetrics, Medical Record Office and Clinical Epidemiology Unit. This network has been aimed at widening access of staff to information relating to the problems that need consideration outside their specialties. So far, in addition to the existing weekly integrated case presentation, conferences are carried out on specific topics [9 in the first three months]....The advantage of the availability of the radio-computer network to the hospital has been an increase in the intensity of interdepartmental discussion and consultation regarding medical problems that need other specialists' considerations."

- From **Wonogiri District Health Office - Health Information System**: "The network has helped local health staff decide on quick interventions as a response to epidemiological outbreaks, such as the food poisoning that occurred last year....Topical conferences and

consultations have become part of our continuing medical education....The installation of a radio-computer set in Wonogiri has made possible distant consultation between Field Epidemiology Training Program students doing field work and their supervisors on the university campus. Compared to the old system of hospital visits every Monday and Wednesday, surveillance activities have been far more efficient with this network."

- From the **Educational Development Unit of the GMU School of Medicine - Student/ Faculty Communication:** "Output evaluation reveals that post graduate students used the terminal frequently for consulting and communicating with their supervisors. Students have fully participated in radio-computer topical conferences held by HPAU."

Difficulties cited in the evaluation include unfamiliarity of some staff with computer hardware and software, technical problems in computer operation, and electricity problems. The study showed that 48% (9 of 19) of terminals were used daily, with duration of use ranging from 1 to 2 hours per day (26% of terminals) to 30 minutes (16% of terminals). Two terminals were never used, due to technical problems.

## Other Communication Vehicles

One of the goals of the HPAU project was to "establish a multi-level health information system whereby health-related data are summarized at the sub-district level and distributed both vertically to the central Ministry of Health facilities and horizontally to interested organizations and community groups." The radio-computer telecommunication network is one vehicle for achieving this goal. In addition, the unit produces a newsletter and puts together reports and displays.

### *Newsletter*

The newsletter, jointly published by the HPAU and the Community-Oriented Medical Education Program (COME), is called *Prioritas Kesehatan* (The Health Priorities Bulletin). About 300 copies of the bulletin are distributed to district health offices, health centres and area physicians. It provides community health information that comes from a variety of sources, including several communities that participate in the project. In 1991 and 1992 there were five issues per year, each addressing one or two topic areas, and published in Indonesian and English. The topics, which reflect areas explored through the computer conference mechanism, included:

- measles (including data from the Wonogiri District);
- dengue hemorrhagic fever (including local data from Yogyakarta province);
- an outbreak of diphtheria in central Java;
- neonatal tetanus occurrence in central Java ( including a discussion of immunization against tetanus);
- a tuberculosis control program in Yogyakarta;
- a diarrhea outbreak in a sub-district of Wonogiri District (including a discussion of environmental sanitation).

In 1993, the bulletin was published in Indonesian only, and started to be based on the topics discussed in the computer conferences carried out over the telecommunication network. Topics addressed include tuberculosis, thalessemia, dengue hemorrhagic fever and immunization.

***Reports and Displays***

The amount of time and effort devoted to communicating through reports and displays varies according to location. The Puskesmas Salam (Salam Health Centre) in Megalang District seems to have one of the most effective programs in this area, led by the senior health centre doctor (one of the GMU faculty fellows who studied at McMaster University through the HPAU project). Staff of the Puskesmas Salam take health and health-related data gathered by the health centre - including data from the village maternal and child health clinics (Posyandu) - organize it, analyze it, and present it in graphics, tables and text that are dramatically better and easier to understand than the reports produced before the project began. These data are presented in the Annual Report of the Puskesmas, which is sent to the District Health Office and the Ministry of Health.

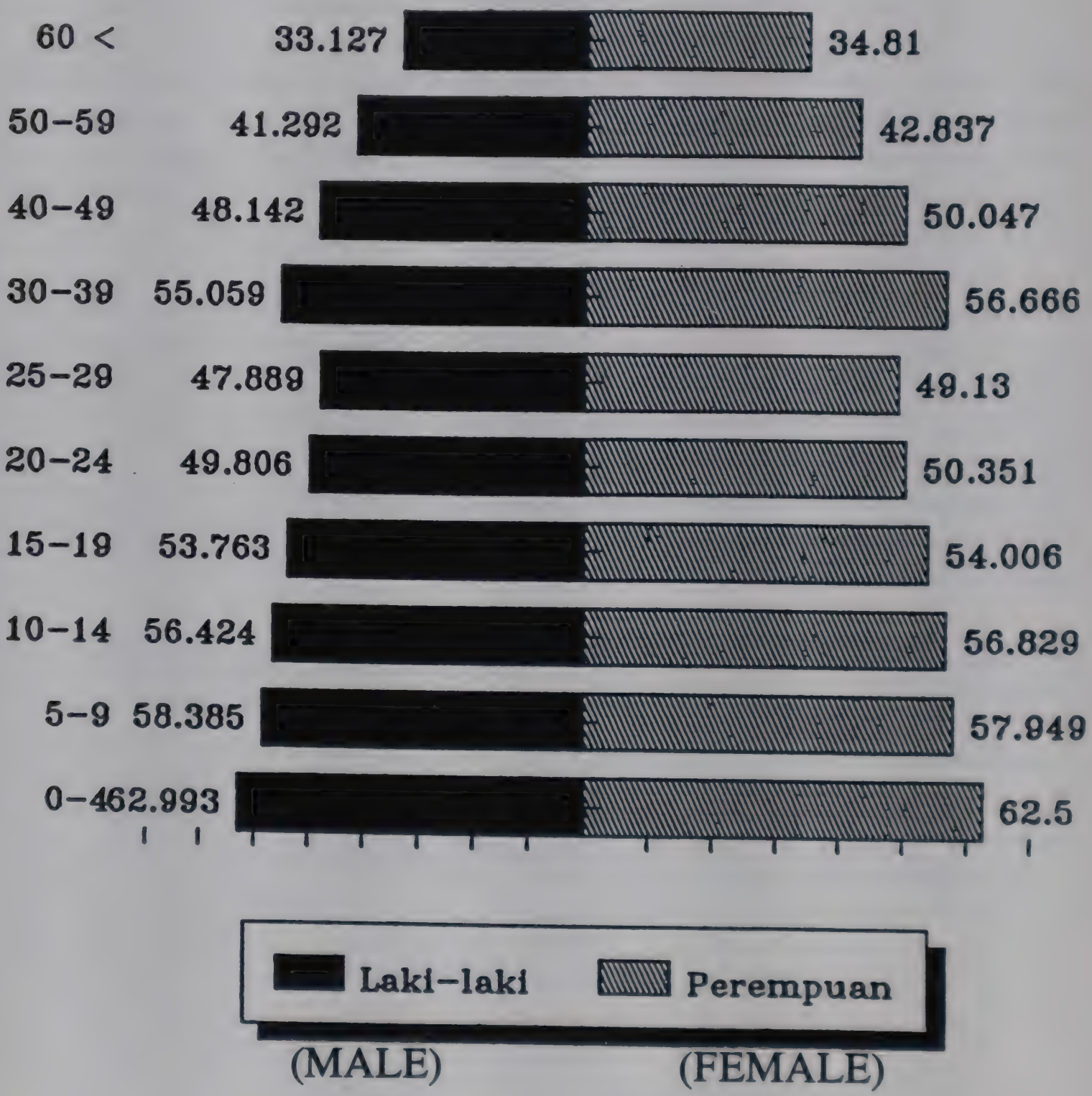
Graphs and charts presenting health data relevant to the district - such as population pyramid, the ten most important/prevalent health problems, trends in infant mortality, immunization level among children and pregnant women - are prominently displayed in the meeting room that is used by health centre staff (see sample "Population Pyramid" reproduced on page 34). Medical students from GMU who attend the Puskesmas Salam are introduced to the concepts of data gathering, analysis, effective presentation and prioritization of health problems. They are required to carry out a project and prepare a report using these concepts.

## Supporting the Community-Oriented Medical Education (COME) Curriculum

Another major HPAU activity was to produce information and learning resources that support the continued orientation of the medical curriculum toward identified community health priorities and needs. At the end of the funded project, initiatives to teach the concepts of health priorities were in place for undergraduate students and interns in the Community-Oriented Medical Education (COME) program, in the Clinical Epidemiology Research and Training Center, in Megalang Health Centre, in Sardjito Teaching Hospital, and through the HPAU.[2] The key ideas of the COME program have now been integrated into the medical education program as part of a major curriculum review process.

[2] More information on initiatives to orient the medical curriculum to community priorities can be found in the Report of the Conference and Workshop (1993), available through GMU or the Centre for International Health, McMaster University.

Health priority analysis is at the core of the COME program. At the end of the program, students are expected to be skillful in analyzing clinical and program intervention on the basis of community health priority. As part of the program, students spend four weeks in one of the 19 health centres in the Yogyakarta area. They are then required to prepare plans of action for the health centre that they have attended.




Sample: Population pyramid for Magelang (1992)

## Problems Encountered and Lessons Learned

Ongoing evaluation of the project's activities has taken place through a variety of mechanisms: the work of the Advisory Committees in both GMU and McMaster University, which included site visits; internal evaluation by GMU; a June 1993 Conference and Workshop attended by 45 participants from Indonesia and Canada, to review the project and discuss the future of the initiatives implemented during the project's tenure.

In addition to technical problems in the infrastructure - especially the radio-computer telecommunication network - the project suffered due to the low level of motivation in the general GMU faculty and staff to participate in the project. It was also affected by a conceptual problem: the fact that the centralized managerial system in the Ministry of Health may have a negative impact on the motivation of local personnel to improve the local data management and health systems planning. As yet, the project has had limited coverage: the area included has been restricted to a radius of about 50-60 km. around Yogyakarta. There are plans to extend this.

At the same time, several major project initiatives have been implemented with a large measure of success:

- infrastructure for communication, consultation, conferencing and distance learning has been established, is operational, and is in active use;
- the integration of Health Priorities Analysis Unit activities into undergraduate medical education and the graduate program in public health has made substantial progress;
- continuing education for health professionals in the health centres, hospitals and district health offices has been substantially improved;
- interest in the resources and activities of the project is sufficiently high that most Department of Health Units and District Health Offices would like to see the initiatives sustained (some already having made some local financial commitments) and expanded to include other groups in East Java and elsewhere.

## Chapter Two: Building a Health Intelligence Service: An Example from Canada

McMaster University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# Building A Health Intelligence Service: An Example from Canada

McMaster University

## Introduction

Throughout the latter part of this century, the concept of "health" has expanded to include issues of social, economic, mental and physical well-being - not just the absence of physical illness. New questions have been raised: How do these various health factors or determinants fit together? How do we know whether our current health programs are really effective? How can we promote healthy aging for individuals and the community at large?

The Health Priorities Analysis Unit (HPAU) at McMaster University was created to help the Hamilton-Wentworth community explore and respond to these questions. In a 1982 conference on "Health in the 80's and 90's," Dr. Kerr White suggested that "every vice-principal or vice-president presiding over a health sciences centre should have attached to his or her office a dynamic and creative intelligence service." His argument was that in countries such as Canada there is an abundance of health-related data that is greatly underused, because there is no system to make it available to the right people at the right time and in a form that is easy to understand.

While the HPAU does gather new data from time to time, its primary role is to analyze and interpret data, and present it in a form that is of practical use to planners and decision-makers. Originally intended to focus on making information on community health priorities available to curriculum planners and researchers within the Faculty of Health Sciences, the work of the HPAU is now actively linking the university with health policy makers, health delivery services and a wide range of community groups. The "health intelligence unit" model is proving to be a useful mechanism for building local capacity to gather, analyze and interpret health information.

## Mandate and Structure of the Health Priorities Analysis Unit

The HPAU was established at McMaster University in 1987, at a time when the work of Task Force 2 was highlighting the importance of reliable community health data in the identification of health priorities for curriculum planning. From the beginning, it has been linked to and receives ongoing funding from the Educational Centre for Aging and Health and the Hamilton-Wentworth Department of Public Health Services - a teaching health unit affiliated with McMaster University and the University of Guelph. (Some HPAU activities are supported by grants and contracts from other outside agencies.) It has a strong mandate to address community health issues related to seniors in the health sciences programs. This is not, however, a narrow mandate - recognizing that health promotion

within the community at large has a direct impact on the health of current and future seniors.

The HPAU addresses the mandate of the Educational Centre for Aging and Health, and the Faculty of Health Sciences, by:

- ensuring a population/community health focus in health science education programs;
- developing community health indicators which have relevance in education, research and service;
- monitoring health in the regional municipality.

A basic premise of the HPAU's work is that in analyzing and interpreting quantitative data, it is important to consider qualitative information as well - especially the knowledge and opinions of people involved first-hand in community health issues. In order to facilitate community linkages, the unit was physically located in close proximity to the Regional Department of Public Health. In the formative stages, the HPAU was governed by two advisory bodies - a Community committee and an Education and Research committee - while being administratively responsible to a Faculty of Health Sciences Steering Committee chaired by the Associate Dean for Education. This structure was eventually found to be inefficient and to work against the principle of close communication between the university and the community. The two committees have now been replaced by a single advisory committee with members from the community, the Hamilton-Wentworth Department of Public Health Services, the Hamilton-Wentworth District Health Council, the Social Planning and Research Council, the Hamilton-Wentworth Planning and Development Department, and the McMaster University Faculty of Health Sciences - including health sciences students.

## Activities

The HPAU's role is to analyze existing data related to the health of the community (and advise on the collection of new information when necessary), communicate it to a wide range of stakeholder groups, and work with these stakeholders to assess how the data can best support effective programming and positive change. It does this through:

- **Fact Books:** In 1987, 1988 and 1994, the HPAU published a "Fact Book" on the health of Hamilton-Wentworth residents. Designed to provide people with easy access to routinely collected community health status information, the Fact Book compiles tables and figures from available reports and data sets, such as the Ontario Health Survey and the 1991 Census.

- **"Infowatch" Newsletters**: Since 1989, the HPAU has published 23 "Infowatch" newsletters on topics ranging from "Health and Living Below the Poverty Line" to "Spotlight on Measles" to "Seniors...Their Health Problems in Focus" (see Table I).

"Infowatch" is distributed to 4,000 students, faculty, family physicians and agencies in Hamilton-Wentworth.

- **Consultations:** In 1994-95, the HPAU provided assistance and consultation to more than fifty organizations and over one hundred individuals who sought community health information about the residents of Hamilton-Wentworth. Of these requests, 26% were specific to seniors (aged 65 years or older), or related to a particular issue of "Infowatch."

- **Courses:** The HPAU was involved in creating a course in "Community Health Measurement," which is offered within the Faculty of Health Sciences' M. Sc. Design Measurement and Evaluation Program. This course is intended to provide students with skills to:
  - identify available community health measures and indicators;
  - critically review the strengths and limitations of these;
  - appropriately apply community health measures or indicators to examine and quantify the health of communities.

- **Analysis of Surveys and Studies:** The HPAU recently co-ordinated and analyzed a provincial Public Health Nurse Survey on the roles and education needs of nurses working in public health units. The HPAU also serves as the base for the McMaster Centre of the Canadian Study on Health and Aging (CSHA). This is one of 18 centres in Canada participating in a national study of 9,000 people age 65 and over. The project is now in its second phase, re-evaluating participants in the 1991-92 study. The HPAU is conducting analyses of the national data and of McMaster Centre investigations.

- **Research Fellows:** The Laboratory Centre of Disease Control, Health Canada, is supporting a research fellow location in the HPAU to analyze injury data from national surveys for planning at the local, provincial and national levels.

- **Special Projects**: The HPAU's involvement in the "Educating Future Physicians for Ontario" project is focused on developing strategies to include community health status information in the planning and content of medical education programs. The HPAU is also the coordinating office for the "Health of the Public" project. Funded for the period 1993-96, this initiative supports community/university "twinning" arrangements, faculty involvement in community health and social service priority-setting, and establishment of an inventory of community/university projects and collaborations.

Table I. "Infowatch" Newsletters

| | | |
|---|---|---|
| April, 1989 | Volume 1 No. 1 | Services for Seniors |
| November, 1989 | Volume 1 No. 2 | Survey of Fact Book Users |
| December, 1989 | Volume 1 No. 3 | Health of Seniors in North Hamilton |
| May, 1990 | Volume 2 No. 1 | The Baby Boom to The Seniors Boom |
| July, 1990 | Volume 2 No. 2 | Children Can't Fly - Child Pedestrian Injuries |
| August, 1990 | Volume 2 No. 3 | Health and Living Below the Poverty Line |
| October, 1990 | Volume 2 No. 4 | Hamilton Butts Out? Cigarette Smoking |
| December, 1990 | Volume 2 No. 5 | Hamilton-Wentworth On the Rocks? Alcohol (Ab)Use |
| March, 1991 | Volume 3 No. 1 | You're Never Too Old ... (Healthy Aging) |
| June, 1991 | Volume 3 No. 2 | Spot-light on Measles in Hamilton-Wentworth |
| October, 1991 | Volume 3 No. 3 | Lights..Camera..(In)Action? Active Living in Hamilton-Wentworth |
| July, 1992 | Volume 4 No. 1 | A series on Seniors 1. Seniors...who are they? |
| August, 1992 | Volume 5 No. 1 | It Was an Accident...or Was It? Injuries in Hamilton-Wentworth |
| March, 1993 | Volume 5 No. 2 | A series on Seniors 2. Seniors...their health problems in focus! |
| March, 1993 | Volume 6 No. 1 | You are what you eat? (Nutrition in Hamilton-Wentworth) |
| August, 1993 | Volume 6 No. 2 | A Healthy Balance! Weights and Physical Activity Patterns in Hamilton-Wentworth |
| June, 1994 | Volume 7 No. 1 | Nurturing Health and Health Care in Hamilton-Wentworth |
| October, 1994 | Volume 7 No. 2 | Falls and Seniors in Hamilton-Wentworth |
| December, 1994 | Volume 7 No. 3 | A Pill for Every Ill? Medication Use By Seniors |
| April, 1995 | Volume 8 No. 1 | Breastfeeding Exclusive |
| July, 1995 | Volume 8 No. 2 | Who Cares? Long-Term Care in Hamilton-Wentworth |
| October, 1995 | Volume 8 No. 3 | Not Born In Canada? How's Your Health in Hamilton-Wentworth |
| February, 1996 | Volume 9 No. 1 | Violence Against Women in Hamilton-Wentworth |

These are just a few highlights and examples of the HPAU's recent work. Since its inception, the HPAU has been involved in more than 25 projects, and has produced almost 90 publications. Community experts in relevant fields contribute to this work on a regular basis, and help ensure that publications are both accurate and useful.

A number of the HPAU publications are circulated to Health Sciences faculty and students. They are considered valuable resources and useful additions to student handbooks. Organizations such as the District Health Council, local advisors to the Ministry of Health, and the Social Planning and Research Council incorporate material from HPAU documents and publications in their deliberations and recommendations. Information disseminated by the HPAU has been used by the Regional Municipality's Planning office both in day-to-day planning and in the preparation of its long-range Vision 2020 document. Even the local newspaper occasionally uses HPAU publications as the basis for articles on community health issues.

## Lessons Learned and Future Directions

One of the key lessons learned is that there is substantial interest within the community, the university and government in improving the quality, accessibility and use of information relating to health status, determinants of health (lifestyles, physical and social environment, health care), resources, utilization and outcomes. While the Faculty of Health Sciences' purpose in establishing the HPAU was to provide baseline information for curriculum planning, experience to date suggests that a unit with that sole focus would not be viable. The HPAU's strong linkages with and services to various community and government groups have been essential to its survival and growth.

Funding is an ongoing challenge, as has been ensuring that the goals of the original funder (the Educational Centre for Aging and Health) continue to be met as new initiatives are undertaken. While HPAU publications have been well received within the university and the community, the HPAU itself does not have a high profile and is not well understood, especially by students. The recent development of a graduate course on measurement of community health has helped acquaint students with the HPAU and its goals, and more of this type of activity is envisioned for the future.

McMaster's HPAU has become a demonstration model for a network of similar units at other Ontario health sciences institutions. There is now some form of regional health intelligence unit (HIU) in each of the five major academic health sciences centres in Ontario, although the units go by different names in the different institutions, and have a regional mandate (one to two million population) rather than the district focus (400,000 population) of the HPAU. The Government of Ontario has recently provided funding for these units, to ensure that the information analyzed will be used by regional municipalities and district health councils. The HIU network will provide a mechanism for determining

health education, research, and service priorities for Ontario, in part through a new network of researchers and decision-makers known as the Ontario Health Care Evaluation Network (OHCEN).

# Chapter Three: Making the Most of Scarce Resources: Community-Based Medical Education in Nigeria

University of Ilorin


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# Making the Most of Scarce Resources: Community-Based Medical Education in Nigeria

University of Ilorin

## Introduction

In most developing countries, financial resources are limited. It is therefore critical that the training of health workers for health care services reflect regional needs and focus on the important problems that these health professionals will be called upon to solve. Curricula for the education of health professionals must deal with the priority health problems of the region.

In Nigeria, with its crippled economy, steps have been taken to ensure that resources are allocated on the basis of the country's health priorities, and that the education of medical students is relevant to the health needs of society. In 1975, the Nigerian National Universities' Commission insisted that all new medical schools be "community-oriented." The Commission's contention was that students who spend a significant proportion of their learning time interacting with the community will gain a better understanding of the ecology of disease in the area where they will most likely be practising after graduation. Curricula of these "community-oriented" schools were to be built around the region's priority health problems.

A couple of years later, the University of Ilorin was established. In keeping with the Commission's directive, the University authorities decided to found a community-oriented medical school with an integrated curriculum, and a student-centred, problem-based approach to learning. In 1978, they called upon experts from Nigeria, Canada and the World Health Organization to assist in developing the new school's educational philosophy.

This submission describes the community-based program that has been put in place in the ensuing years. It then looks at the particular challenge of collecting valid data on which to base decisions as to which health problems are regional priorities.

## The Community-Based Experience and Services for Medical Students (COBES) Program[1]

The COBES program is designed to give young medical students early and ongoing exposure to the community. They undertake their first community posting only five weeks after they begin their training. The objectives of this first four-week posting are to

[1] The COBES program has been described in detail in a 1991 *Lancet* article by J.D. Hamilton and O. Ogunbode, entitled "Medical education in the community: A Nigerian experience."

experience community life at first-hand by living among the people, to learn to exercise their powers of observation in exploring the ecology of disease, and to better understand the impact of environment on health. The students carry out demographic research, document major health problems of the community, and provide some public health services. One of their tasks in this first posting is to undertake a community health campaign related to one of the prevalent conditions they identify.

These activities continue in their second four-week posting, during which they consolidate their earlier findings and study health problems in greater depth. They provide advice, and practical demonstrations in such areas as environmental sanitation and water handling. By their third posting, which takes place in their second clinical year, the students are deeply involved in running clinics under the supervision of medical officers and Faculty staff. The final posting, in their last year of medical school, is strictly clinical.

COBES postings take place at pre-identified sites within Kwara State, in which the University of Ilorin is located. Influential individuals in each community are fully briefed on the objectives of the posting, and play an important role in easing the students' entry into the community and in encouraging community cooperation. While faculty members representing a variety of disciplines supervise the COBES students, the students organize themselves and run their own tutorials, consulting faculty or the resource library available to them as required. Learning is active, relevant to community health problems, and student-centred.

## The Medical Curriculum

Through the community postings, students begin to learn how to identify and respond to priority health problems. For the Faculty of Health Sciences, however, building a medical curriculum that adequately reflects the community's priority health problems demands a more systematic and rigorous process of problem identification and prioritization. The lack of comprehensive and reliable data has made this a challenge. Another challenge is determining the criteria by which problems are to be prioritized: is it how common the condition is? how lethal? or how easily cured?

In 1987, the priority health problems for Kwara State were determined using data collected from the State Ministry of Health, Primary Health Centres, and the University of Ilorin Teaching Hospital. The prioritization formula applied takes into account epidemiological, clinical and social factors: prevalence and incidence, morbidity and mortality, treatability and preventability and the ease with which the condition spreads. For each disease, a Priority Health Index figure was calculated. On this basis, the conditions were ranked in priority order.

In 1992, these top ten conditions were still highly prevalent, but the degree of malnutrition and incidence of road accidents had increased. The various clinical departments of the

Faculty of Health Sciences have used the prioritization information to consider interdepartmental priority health problems and adjust curricula to reflect priorities. Table 1 lists the top ten conditions and contrasts their emphasis in the old and new curricula.

Since the original prioritization exercise in 1987, we have worked to refine and improve our approach to prioritization. The work of Task Force 2 created a scoring system that is sensitive, specific and sufficiently accurate. It takes the social and psychological aspects of health into account, not only the physical. We will be using this approach in our ongoing prioritization efforts. Given the current poor economic situation in Nigeria, priority health problems may change very quickly. We may need to review priorities every four or five years.

## Shortcomings of Data

Identifying a valid prioritization formula is only one part of the challenge; finding comprehensive and reliable data on which to base the prioritization exercise is key. In our prioritization exercises to date, we have used data that represents only the utilization of health resources. This data may not adequately reflect the real burden of illness in the community. Many patients may not seek medical attention. Some may use alternative methods of treatment. We also have concerns about the accuracy and reliability of some of this data.

Our own experience in the community, for example, tells us that there are less common but equally important diseases prevalent in Kwara State that must be addressed either because of morbidity factors or because of the easy availability of effective, efficient methods of prevention, treatment, or eradication. These diseases include tetanus, onchocerciasis, guineaworm and schistosomiasis.

The community activities of the COBES program students are a rich source of data. Through surveys and observations, the students assemble a sizeable body of information that covers social, demographic, environmental, psychological and economic domains, as well as prevalent disease patterns. This information continues to be built every year as new groups of students begin their community postings. There are obvious advantages of this ongoing sampling of the health situation, in comparison with periodic but irregular surveys. After each posting, the students' findings and recommendations are documented and orally presented to the Faculty of Health Sciences and Ministry of Health officials. The Ministry studies the students' recommendations with a view to determining future action.

Medical students in the COBES program have carried out surveys on priority health problems in a number of communities. The results they obtained differ from the ten top health conditions that emerged through the 1987 Faculty of Health Sciences' prioritization activities. We believe that this is because they used actual data from the community, rather than data based on health services utilization.

LIBRARY AND DOCUMENTATION UNIT

Table I. Priority health problems and curricula changes - Ilorin Medical School

| Priority Health Problems | Previous Time Allocations | | | Current Time Locations | | | |
|---|---|---|---|---|---|---|---|
| | Lectures | Clinical | Total Hours | Lectures | Clinical | Tutorials Hours | Total |
| Malnutrition | 4 | 2 | 6 | 3 | 3 | 3 | 9 |
| Gastroenteritis | 4 | 2 | 6 | 3 | 3 | 3 | 9 |
| Malaria | 2 | 1 | 3 | 2 | 2 | 2 | 6 |
| Anemia | 2 | 1 | 3 | 2 | 2 | 2 | 6 |
| Road Traffic Accident | 1 | 2 | 3 | 2 | 3 | 3 | 8 |
| Measles | 1 | 1 | 2 | 1 | 2 | 3 | 6 |
| Respiratory Infections | 2 | 2 | 4 | 3 | 3 | 3 | 9 |
| Hypertension | 2 | 1 | 3 | 2 | 2 | 3 | 7 |
| Tuberculosis | 2 | 2 | 4 | 2 | 3 | 3 | 8 |
| Obstetrics Problems | 3 | 3 | 6 | 3 | 4 | 3 | 10 |

At the same time, we recognize that the information generated by the students is currently not of sufficiently high quality to be used as a fundamental basis for curricula and health services planning. But the potential is there. We are encouraging cooperation between the University and the Ministry of Health to make sensible use of this resource. The health surveys that the students carry out during COBES postings can be jointly and carefully planned by the Faculty and the Ministry to meet the standard required (in terms of data quantity, quality and design) for prioritizing health problems. This type of venture will foster understanding between these partners. It will assist the government in health services planning, and the faculty in rational curriculum review - to the end that the burden of ill-health in the region will be significantly reduced.

## Summary and Future Directions

The participation of the University of Ilorin's Faculty of Health Sciences in Task Force 2 has had significant impact. It has reaffirmed the Faculty's commitment to active, problem-based and student-centred learning using actual national health problems as a focus for learning, and raised the level of awareness and support for this approach in the University at large. We now have plans to implement tutor training to improve the ability of faculty members to support this type of learning, and to mount an aggressive campaign to build our library of learning resources (print, audio, video).

Task Force 2 participation has facilitated dialogue with colleagues in other parts of the world, and enabled the Faculty to engage in ongoing interaction and research via an electronic network. It has motivated the Faculty to more actively advocate the "community-oriented" model with other health institutions, through conferences, invitational workshops and personal site visits by deans of other medical schools.

Most importantly, it has enhanced the institution's capacity to undertake prioritization of health problems and to modify existing curricula to reflect this information. Task Force 2 activities have also encouraged greater cooperation and collaboration between the Faculty and the Ministry of Health, which will over time greatly improve our collective ability to identify and respond to national health needs. Field testing the validity of health problems prioritization is an important next step that will benefit both partners. Another possible step is the establishment of a formal Health Information Analysis Unit to facilitate production of reliable and valid health information.

We will continue to build on this base in the future. One priority is to carry out a comprehensive evaluation of the COBES program, with a view to documenting its merits and weaknesses, and finding ways of improving and sustaining this important program. While this step will be expensive, we believe that periodic evaluation is critical to the credibility and continuing validity of any program.

## Chapter Four: Medical Curriculum Reform in Thailand: Putting Theory into Practice

Chulalongkorn University


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# Medical Curriculum Reform in Thailand: Putting Theory into Practice

Chulalongkorn University

## Introduction

When the Faculty of Medicine of Chulalongkorn University in Thailand was established in 1947, it adopted the course-based curriculum, patterned after British medical schools, that was standard at the time. In 1971, the Faculty began a process of medical education reform with the establishment of a Teaching Training Center in the medical school. It also undertook to develop leaders of reform, by providing opportunities for international study. A first attempt made at this time to formulate an integrated curriculum based on organ systems rather than individual disciplines was not successful. The Faculty Board felt that not enough work had been done on the new scheme, and worried that departments were understaffed to cope with the change. The advocates of reform were young, and not members of the Faculty Board.

The second attempt at curriculum reform, in 1978, resulted in the highly successful Medical Education for Students from Rural Areas Project (MESRAP). This time, the reform had political and financial backing from Thailand's National Economic and Social Development Board, which was searching for ways to increase the number of doctors - particularly in the rural areas. The premise behind the MESRAP initiative was that doctors could be successfully trained in existing health centres, provincial and district hospitals at a fraction of the cost of establishing new medical schools. Students were recruited for this parallel experimental track from rural communities, and agreed to return to work in their communities after graduation. The MESRAP curriculum was problem-oriented, and featured increased and earlier exposure to community medicine.

A study carried out in preparation for the 1987 Fifth National Conference on Medical Education was the impetus for further medical education reform at Chulalongkorn. The assessment of that study was that graduates of Thai medical schools at the time possessed adequate factual knowledge, but exhibited shortcomings in a variety of areas - among them problem-solving ability, critical decision-making and understanding of communities. Recognizing that major reforms in medical education were required, Chulalongkorn established a new experimental track called the "Community-Targeted, Problem-Based Medical Education Program" (CTPB). This submission describes how the work of Task Force 2 contributed to the development of this new program - and conversely, how the process of curriculum reform already underway at Chulalongkorn furthered Task Force 2 goals by providing a real-life "laboratory."

## The Analytic Tool

A Chulalongkorn faculty member joined the Task Force 2 team working on the refinement of an analytic tool that could be used to identify health problems which are currently exerting a high burden of illness on a community (or will do so in the future, according to trend), and in which interventions have the potential to significantly reduce that burden. Their work resulted in the creation of a model "Burden of Illness" index that moves beyond a "ten-leading-causes-of-death" approach to determining priorities, to consider various factors that assess the quality of health.[1] The model reflects the importance of behavioural, social and cultural factors influencing the burden of illness in a community, while encouraging a systematic and scientific approach to prioritization.

Of the eight formula components proposed in the full model, five were judged to be most relevant in the Thai setting.

Table I. The analytic tool, adapted to the Thai context

The formula that was tested for use in Chulalongkorn's curriculum reform was:

$$B = M(F + QD + CB)$$

**Where**

B = burden of illness

M = magnitude of the problem expressed as the incidence or prevalence of that problem in the community

F = case fatality rate of the illness in the natural course of the disease (i.e. without any intervention)

Q = the degree of deviation from normal health, taking into account such factors as disability (temporary or permanent), distress, discomfort, disfigurements, disharmony, dissatisfaction and debt

D = the duration of the deviation from health

CB = the concurrent burden of illness, or harmful effects of the disease under assessment on other healthy individuals in the community.

[1] The model was first described in MacDonald et al. (1989)

In assessing the impact of interventions in the reduction of the burden of ill health, the proponents of this model used the Measurement Iterative Loop described by Tugwell et al (see Fig. 1) as a framework for analysing each of the five components listed above.

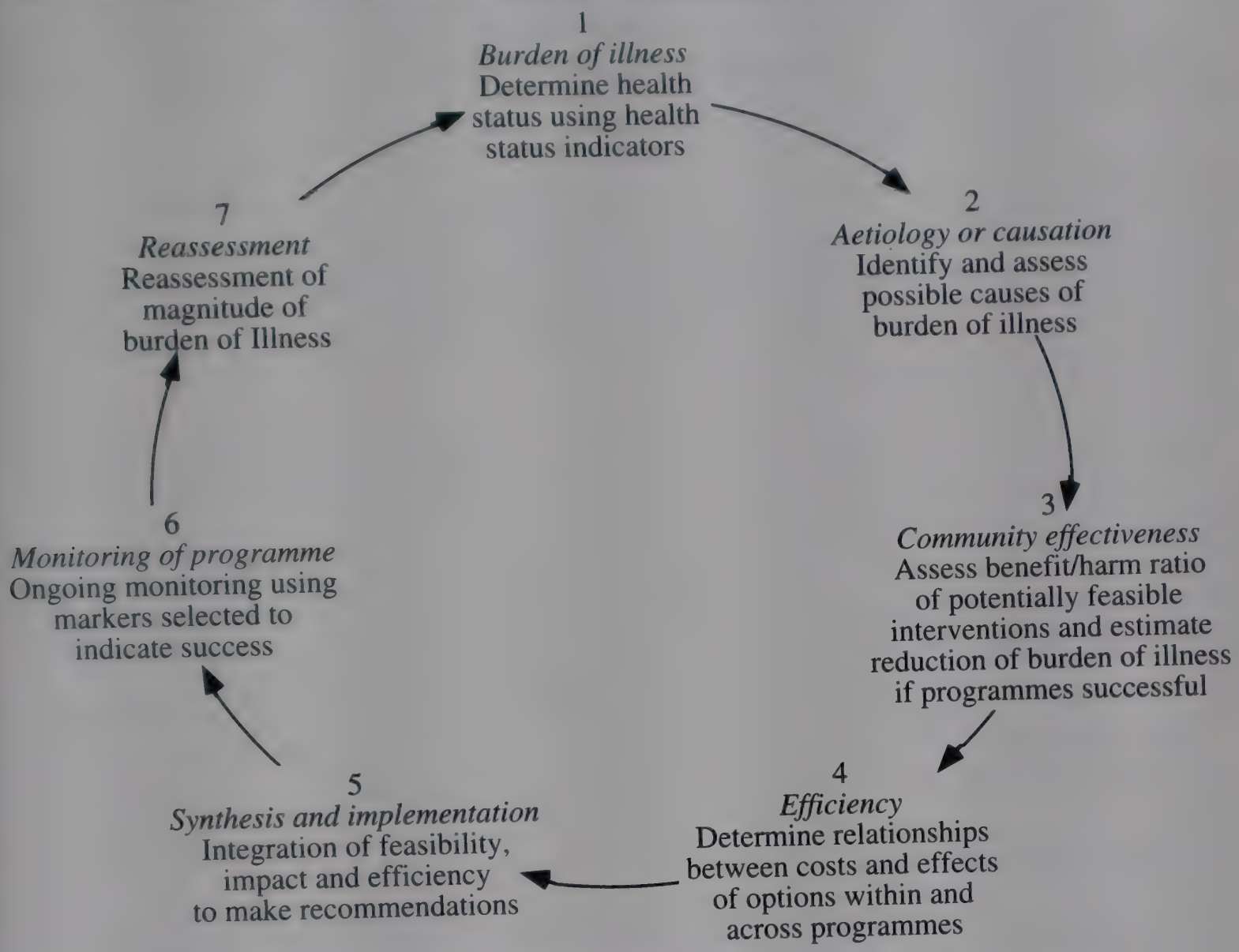
1
*Burden of illness*
Determine health status using health status indicators
2
*Aetiology or causation*
Identify and assess possible causes of burden of illness
3
*Community effectiveness*
Assess benefit/harm ratio of potentially feasible interventions and estimate reduction of burden of illness if programmes successful
4
*Efficiency*
Determine relationships between costs and effects of options within and across programmes
5
*Synthesis and implementation*
Integration of feasibility, impact and efficiency to make recommendations
6
*Monitoring of programme*
Ongoing monitoring using markers selected to indicate success
7
*Reassessment*
Reassessment of magnitude of burden of Illness

Figure 1. The measurement iterative loop

For example, the steps in analysing the potential impact of interventions on the magnitude (M) of a problem are:

- identify the many causes that contribute to the frequency with which that problem occurs in a given population;
- describe the efficacy of any means of intervention that can be applied to tackle each cause (usually preventive or promotive measures such as health education, immunization programs, safe water supply, etc.)
- analyze four other factors which are essential for the effectiveness of the intervention: the coverage, the diagnostic accuracy, the health provider compliance and the patient compliance;
- assess the cost-benefit ratio of each intervention ("efficiency" in the Measurement Iterative Loop model).

The resulting value ($M_2$) represents the potential reduction of the magnitude component ($M_1$) of the burden of illness.

The same process is applied to the other components of the Burden of Illness formula, except for the fatality (F) component. Since $F_1$ is the case fatality rate for the natural course of an illness, the actual **reported** case fatality rate takes into account the impact of interventions, and is therefore the value of $F_2$.

The "after intervention" scores for each of the components are fed into the same equation to produce a $B_2$ score, which represents the burden of illness following intervention. Subtracting the burden of illness following intervention ($B_2$) from the original burden of illness index ($B_1$) produces what was called in the Chulalongkorn context the "PHP Index": the potential reduction of the burden.

Health problems with a high PHP index should be a high priority for medical education, since they place a high burden on the community, and interventions are available that can reduce the burden significantly. As indicated in Table 2 below, malaria and pneumonia were found to be priority health problems in Thailand, since both had a high "burden of illness" or $B_1$ score (83 for malaria, and 81 for pneumonia), and a low "burden of illness following intervention" or $B_2$ score (23 for malaria and 25 for pneumonia). This gave these two health problems top PHP index figures of 60 and 56 respectively. Health problems with a high "$B_1$" (inherent burden of illness) and a low PHP index are still considered important because of their impact on the health of the community.

## Applying the Formula

The formula was successfully applied, using data from the *Notifiable Diseases Summaries 1983* (published by the Epidemiology Division of the Thai Ministry of Public Health) to produce the prioritized list of health problems reproduced in Table II.

While this information is useful for the process of curriculum reform, it does not give the full picture. The table highlights the importance of using complete and multiple sources of data when applying the formula. This information from the Public Health Ministry related to standard infectious diseases only. While the results of this prioritization process make sense within this narrow context, they clearly do not reflect the prevalence of other health problems — trauma being a prime example. When the prioritization process was repeated incorporating data from larger urban hospitals and from the Fact Finding Commission of the National Epidemiology Board of Thailand (1987), it became clear that trauma was in fact a priority health problem. It was also possible to further prioritize a series of health problems that fell under the general heading of trauma (see Table III).

Table II. Priority health problem list (*using data from the Notifiable Diseases Summaries (1983) Thai Ministry of Public Health*)

| Health Problems | M1 | M2 | F1 | F2 | Q1 | Q2 | D1 | D2 | CB1 | CB2 | B1 | B2 | B1-B2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Malaria | 7 | 5 | 6 | 2 | 7 | 3 | 4 | 2 | 0.5 | 0.2 | 83 | 23 | 60 |
| Pneumonia | 7 | 6 | 7 | 2 | 6 | 2 | 3 | 2 | 0.3 | 0.1 | 81 | 25 | 56 |
| DHF * | 6 | 4 | 6 | 1 | 7 | 4 | 3 | 3 | 0.5 | 0.2 | 66 | 19 | 47 |
| Tuberculosis | 5 | 3 | 5 | 3 | 7 | 3 | 8 | 6 | 1 | 0.2 | 67 | 22 | 45 |
| Acute Diarrhea | 9 | 7 | 3 | 1 | 5 | 2 | 1 | 1 | 0.5 | 0.1 | 52 | 18 | 34 |
| Hepatitis | 7 | 5 | 4 | 3 | 6 | 4 | 5 | 5 | 0.8 | 0.3 | 72 | 39 | 33 |
| Typhoid | 4 | 2 | 3 | 2 | 6 | 2 | 4 | 2 | 0.7 | 0.2 | 34 | 8 | 26 |
| Diphtheria | 2 | 0 | 6 | 4 | 8 | 7 | 4 | 3 | 1 | 0.2 | 25 | 0 | 25 |
| Measles | 6 | 3 | 1 | 1 | 8 | 6 | 3 | 3 | 1 | 0.8 | 41 | 18 | 23 |
| Cholera | 2 | 1 | 7 | 3 | 7 | 5 | 2 | 1 | 1 | 0.2 | 23 | 5 | 18 |
| Rabies | 1 | 0 | 9 | 9 | 9 | 8 | 3 | 3 | 1 | 0.2 | 15 | 0 | 15 |
| Encephalitis | 2 | 1 | 6 | 5 | 9 | 7 | 4 | 4 | 0.3 | 0.3 | 25 | 11 | 14 |
| Tetanus | 1 | 0 | 8 | 5 | 9 | 8 | 3 | 3 | 0.2 | 0.2 | 13 | 0 | 13 |
| Dysentery | 4 | 2 | 0 | 0 | 4 | 1 | 3 | 2 | 0.7 | 0.4 | 17 | 4 | 13 |
| Rubella | 3 | 0 | 0 | 0 | 3 | 2 | 3 | 3 | 0.8 | 0.2 | 10 | 0 | 10 |
| Conjunctivitis | 6 | 5 | 0 | 0 | 4 | 3 | 2 | 2 | 1 | 0.7 | 23 | 16 | 7 |

* DHF = Dengue Hemorrhagic Fever

**Burden Of Illness Formula**

M = magnitude of illness
F = case-fatality rate
Q = lost quality of life
D = duration of ill health
CB = concurrent burden

Burden of Illness = $M \times (F + \sqrt{QD} + CB)$

1. Is parameter without intervention
2. Potential improvement in parameter with intervention

Table III. Assessment for PHP index for Block 2, Trauma

| Health Problems | M1 | M2 | F1 | F2 | Q1 | Q2 | D1 | D2 | CB1 | CB2 | B1 | B2 | B1-B2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Abdominal Injury | 8 | 6 | 8 | 5 | 8 | 2 | 4 | 3 | 0 | 0 | 110 | 45 | 65 |
| Cardiothoracic Injury | 7 | 6 | 8 | 4 | 8 | 2 | 4 | 3 | 0 | 0 | 96 | 39 | 57 |
| Spine Injury | 6 | 5 | 8 | 4 | 8 | 2 | 6 | 5 | 0 | 0 | 90 | 36 | 54 |
| Kidney Ureter & Bladder | 6 | 5 | 8 | 4 | 8 | 2 | 4 | 3 | 0 | 0 | 82 | 32 | 50 |
| Dislocation | 8 | 6 | 2 | 1 | 8 | 2 | 6 | 5 | 0 | 0 | 71 | 25 | 46 |
| Fracture (Extremity) | 8 | 6 | 2 | 1 | 8 | 2 | 6 | 5 | 0 | 0 | 71 | 25 | 46 |
| Head Inury | 7 | 6 | 8 | 5 | 8 | 2 | 3 | 3 | 0 | 0 | 90 | 45 | 45 |
| Facial Injury | 8 | 6 | 3 | 2 | 8 | 2 | 4 | 3 | 0 | 0 | 69 | 27 | 42 |
| Burn | 5 | 4 | 8 | 4 | 8 | 5 | 5 | 4 | 0 | 0 | 72 | 34 | 38 |
| Neck Injury | 5 | 4 | 7 | 4 | 8 | 2 | 4 | 3 | 0 | 0 | 63 | 26 | 37 |
| Vascular Injury | 4 | 3 | 8 | 4 | 8 | 2 | 4 | 3 | 0 | 0 | 55 | 19 | 36 |
| Soft Tissue Injury | 9 | 6 | 1 | 0 | 5 | 2 | 4 | 3 | 0 | 0 | 49 | 15 | 34 |
| Nerve Injury | 4 | 3 | 2 | 1 | 8 | 2 | 9 | 8 | 0 | 0 | 42 | 15 | 27 |

**Burden Of Illness Formula**

M = magnitude of illness
F = case-fatality rate
Q = lost quality of life
D = duration of ill health
CB = concurrent burden

1. Is parameter without intervention
2. Potential improvement in parameter with intervention

Burden of Illness = $M \times (F + \sqrt{QD} + CB)$

## Using the Data for Curriculum Development

Because trauma emerged as a new priority in the process, the Chulalongkorn Curriculum Planning Committee, facilitated by the Task Force 2 fellow, undertook to create a "study block" on trauma for the new CTPB curriculum. Trauma is now the second of ten blocks in the pre-clinical phase - which spans thirty months of the five-year CTPB curriculum. (Table 4 lists all ten study blocks.) Some study blocks (such as Environmental and Occupational Health, Degenerative Disorders and Aging) were included as the result of a trend analysis of the burden of illness that would face the community in the near future.

Table IV. Phase 1 study blocks; community-targeted, problem-based curriculum

| | |
|---|---|
| Block 1 | Introduction to Problem-Based Learning<br>Contents: self-directed learning, clinical skills, critical thinking skills, applied computer skills in medicine, evaluation process, community health problems |
| Block 2 | Trauma |
| Block 3 | Infectious Diseases |
| Block 4 | Behavioural Science and Psychiatry |
| Block 5 | Oncology |
| Block 6 | Administration |
| Block 7 | Reproductive Health |
| Block 8 | Growth and Nutrition |
| Block 9 | Environmental and Occupational Health |
| Block 10 | Degenerative Diseases and Diseases of Aging |

The committees designing the study blocks considered lists of prioritized health problems in each general area in the selection of case scenarios. The scenarios were chosen according to their PHP index (problems with high PHP indices being of high priority) as well as for their ability to facilitate learning of the key concepts identified for each block. Tables V and VI outline identified concepts for the trauma block and the problem scenarios that were eventually chosen for inclusion.

Table V. The block concepts, Trauma Block

1. Structure in which the injury occurred
2. Initial care of injury
3. Shock
4. Body response to the injury
5. Body impairment and repair due to trauma (functional changes)
6. Characteristics of coma
7. Effects of contaminations
8. Prevention of trauma
9. Medicolegal aspects of trauma
10. Medical ethics

Table VI. The problem scenarios, Trauma Block

1. Abdominal Injury - Penetrating injury of abdomen
2. Cardiothoracic Injury - Blunt chest trauma
3. Spinal Injury - Falling accident
4. Lower Extremities Injury - Hip dislocation, vascular injury
5. Upper Extremities Injury - Fracture of humerus
6. Head Injury - Motorcycle accident
7. Facial Injury (Soft Tissue Injury) - Facial lacerations
8. Burn - Household accident
9. Neck Injury - Gun shot wound

## Conclusion

The importance of systematically prioritizing health problems to provide a framework for community-targeted curriculum development has now been firmly established at Chulalongkorn, and the validity of the "burden of illness" formula as an analytic tool confirmed. The activities described in this submission received full support from the Dean of the university, the Associate Dean in Education, the Head of the Medical Education unit and members of the curriculum committee. The first group of students from the CTPB track all successfully passed the comprehensive examination taken by their counterparts in both the conventional track and the MESRAP program. Discussion is now taking place on the possibility of blending the three tracks into one.

One major constraint that will need to be addressed in future planning is the lack of the kind of comprehensive data required to rigorously apply the formulas and calculate the PHP indices. In the interim, curriculum planners will have to rely to some extent on expert estimates and their own experience.

## Chapter Five: Priority Health Problems in Nursing Curricula: A Perspective From Canada

McMaster University


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# Priority Health Problems in Nursing Curricula: A Perspective From Canada

McMaster University

## Introduction

Curriculum planning in the health sciences is becoming increasingly complex, due to rapid societal change and scientific discovery. Because the half life of most curricula is said to be five years, both content and process must be frequently examined and revised. In the experience of the School of Nursing of McMaster University, determining essential content for curricula can be a laborious process, marked by conflict and hours of endless circular debate.

Since the ultimate goal of nursing education is to produce graduates who will contribute to the health and quality of life of the individuals and communities they serve, the curriculum should be guided by an accurate identification of health issues arising from and defined by the community. This submission describes a planned approach to identifying core content that is both practical and specifically geared to reflecting community needs. This approach de-emphasizes debate based on personal intuition and opinion, concentrating instead on quantitative and qualitative data about the community. At its base is a scoring system method for determining priority health problems for medical education that was first described by MacDonald et al in 1989. The McMaster School of Nursing experience shows how the method can be modified and applied to curriculum planning in other health disciplines.

## Approaches to Curriculum Planning

The planning of nursing curricula usually involves two stages: first, the development of and/or agreement upon a theoretical framework, and then decisions on core content and teaching methodologies. This submission focuses on the second stage.

Some argue that all health issues should be addressed in the curriculum in order that the graduate be prepared to deal with them. This approach often leads to what has been referred to as "curriculum hypertrophy": in an attempt to be all-inclusive, the curriculum grows without bounds and without focus.

Sometimes priorities are established on the basis of what certain individuals on the teaching staff deem important. In other cases, a consensus approach is chosen. This submission describes a decision-making model that makes efficient and systematic use of quantitative and qualitative data from a variety of sources to determine which health problems are priorities in the community served by the institution. It uses epidemiological

data to help identify indicators of health and illness within the community population. It looks to demographic and technological trend analyses to determine emerging priorities. Professional and public opinion in the form of government statements, community surveys and expert consultation are also considered, as is information relating to societal values, changing ethical and legal priorities and professional expectations.

The model has three components:

- determining the "Burden of Illness" index score for each health problem, using a formula (adapted from the model proposed by MacDonald et al) that reflects nursing objectives;
- determining the change in score which may be expected to result if the effectiveness of a nursing intervention is taken into account;
- examining qualitative data to balance the emphasis of the first two steps on medical aspects, and to reflect the unique mission of nursing.

This approach retains the quantitative element proposed by MacDonald et al, but permits discipline-specific interpretations and applications. Nursing curricula must address those problems or issues that are highest priority both in terms of their burden to individuals and society, and their amenability to nursing intervention. An inherent premise is that a health-related issue on which nursing can expect to have a high impact is of higher priority for a nursing curriculum than one on which nursing can expect to have very little impact.

## The Burden of Illness Index

The original formulation proposed by MacDonald et al evaluated each medical disorder according to eight criteria, based to some extent on the "Measurement Iterative Loop" (Tugwell et al, 1985). The disorder was assigned a score for each, ranging from 0 to 2. Problems were ranked by summing the scores (MacDonald, 1989; Tugwell, 1985).

For the purposes of health problem prioritization in nursing curricula, we revised the formula to include only five categories, which reflect the four objectives of nursing to:

- decrease the magnitude of the problem;
- facilitate maximum function;
- improve quality of life;
- minimize the duration of the problem.

The five categories are:

- *Magnitude of the Problem:* It is common to quantitate a health issue by using epidemiological descriptors such as incidence and prevalence. (In the North American context, these data are readily available from local, provincial/state and federal sources.) Examination of such quantitative data provides information about the natural history of the problem, as well as its identification as common,

uncommon or rare. This information is used to describe the *magnitude* of a problem.

- *Case Fatality Rates:* Analysis of *case-fatality rates* provides some information about the severity of a problem. The study of such a problem involves an understanding of the pathophysiology that leads to such severe consequences. Again, in North America case fatality data are usually readily available from large data storage agencies such as Statistics Canada/U.S. National Center for Health Statistics.
- *Lost Quality of Life*: The factor called *lost quality of life* requires analysis of the symptoms which characterize a disorder and the physical, emotional, psychological and social impact on the individual. This factor is especially important to the practice of nursing, but it is also the most difficult to determine with accuracy, since there is rarely sufficient information available about changes in quality of life after an illness begins. The score assigned to this factor is the "best estimate" of the expert clinicians who deal with the health problem in question. There are a variety of methods available, and while no one "gold standard" exists, there are several instruments designed to assess dimensions of health-related quality of life (Guyatt, 1989; Feeny, 1990). In spite of the uncertainties surrounding this measure, MacDonald et al justify its inclusion because quality of life issues are of vital importance in understanding an illness.
- *Duration of Ill Health:* Analysis in this category addresses the length of time that nursing intervention may be required. Nursing intervention in this context is primarily restorative and rehabilitative. In the quantitative exercise, *duration of ill health* refers to the acute phase of a particular health problem: the phase in which the need for nursing intervention is most continuous. This prediction value is arrived at using a Delphi technique and expert opinion.
- *Concurrent Burden Factor:* This factor relates to the potential burden - in health and/or economic terms - that a health problem may create within the community. For instance, sexually transmitted diseases score high on this factor because of their potential to affect the health of many people in the community.

Table I outlines the scoring system for each category, and the formula that is applied to these factors to calculate the overall burden of illness. (For further elaboration on the use of health data to determine the score in each category, see MacDonald et al.)

The application of the formula to data relating to each health problem produces a raw score ($B_1$) on the basis of which problems can be ranked according to burden of illness. Problems with higher scores are higher priority.

Table I. The scoring system - burden of illness (B)

| Magnitude | | Case-Fatality Rate | |
|---|---|---|---|
| Score | Incidence/100,000 | Score | CFR |
| 0 | <0.01 | 0 | <0.01% |
| 1 | 0.01-0.99 | 1 | 0.01-0.1% |
| 2 | 1.00-4.99 | 2 | 0.11-0.99% |
| 3 | 5.00-9.99 | 3 | 1.00-4.99% |
| 4 | 10.00-29.99 | 4 | 5.00-9.99% |
| 5 | 30.00-59.99 | 5 | 10.00-19.99% |
| 6 | 60.00-119.99 | 6 | 20.00-39.99% |
| 7 | 120.00-239.99 | 7 | 40.00-59.99% |
| 8 | 240.00-479.99 | 8 | 60.00-79.99% |
| 9 | 480.00- | 9 | 80-100.00% |

| Quality of Life | | Duration of Ill Health | |
|---|---|---|---|
| Score | Percentage Loss | Score | Duration |
| 0 | 0-10% | 0 | <24 hours |
| 1 | 11-20% | 1 | 1-3 days |
| 2 | 21-30% | 2 | 4-7 days |
| 3 | 31-40% | 3 | 8-14 days |
| 4 | 41-50% | 4 | 15-21 days |
| 5 | 51-60% | 5 | 22-41 days |
| 6 | 61-70% | 6 | 6 weeks-3 months |
| 7 | 71-80% | 7 | 3 months-1 year |
| 8 | 81-90% | 8 | 1 year-3 years |
| 9 | 91-100% | 9 | >3 years |

| | Concurrent Burden of Illness |
|---|---|
| Score | Criteria |
| 1 | Create major health/economic hazard to the community |
| 0.5 | Create minor health/economic hazard to the community |
| 0 | Does not create any health/economic hazard to the community |

**Burden Of Illness Formula**

M = magnitude of illness
F = case-fatality rate
Q = lost quality of life
D = duration of ill health
CB = concurrent burden

$$\text{Burden of Illness} = M \times (F + \sqrt{QD} + CB)$$

## The Nursing Intervention Factor

For the purposes of planning nursing curricula, however, the prioritization process must also take into account the likelihood that nursing intervention can reduce the burden of illness. Our next step was to go back through each factor in the formula and determine the change in score which might be expected to result from a nursing intervention in the most optimistic scenario. Since the unique contribution of nursing to health care relates most closely to maintaining quality of life, reducing duration of ill health, and reducing magnitude (via primary prevention), the impact of nursing intervention is likely to be greatest in these areas.

This exercise produces another score ($B_2$) that reflects the potential reduction in the burden of illness of a given problem as a result of nursing intervention. The greater the reduction in score, the greater the potential impact of nursing - and the higher priority assigned to the problem in curriculum planning.

The change in burden of illness score as a result of nursing intervention ($B_3$) is determined by subtracting $B_2$ from $B_1$. $B_3$ is then added to $B_1$ (the original burden of illness score) to determine the final score ($B_4$) used to determine the priority of each health problem for nursing curricula (see Table II).

For example, as can be seen in Table II below, on the basis of its "burden of illness" score of 38.5, diabetes ranks third in a list of five health conditions that includes myocardial infarction, AIDS, inguinal hernia and otitis media. However, diabetes is also an area where a nursing intervention can be expected to have high impact: its $B_2$ score (potential reduction in burden of illness as a result of nursing intervention) is 32.5. The difference between these two figures ($B^3 = 6$) added to the original "burden of illness" score of 38.5, gives a priority score for nursing curricula ($B_4$) of 44.5 - raising it above otitis media, which scores higher on "burden of illness" but has a $B_3$ score of 0.

Table II. Application of formula

| Assessing the Burden of Illness | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Health Condition | M | F | Q | D | √QD | CB | B1 | RANK |
| Myocardial Infarction | 6 | 5 | 2 | 7 | 3.7 | 1.0 | 58.2 | 1 |
| AIDS | 1 | 9 | 6 | 8 | 6.9 | 1 | 16.9 | 4 |
| Diabetes | 5 | 3 | 2 | 9 | 4.2 | .5 | 38.5 | 3 |
| Inguinal Hernia | 3 | 0 | 1 | 7 | 2.7 | 0 | 8.1 | 5 |
| Otitis Media | 8 | 0 | 6 | 4 | 4.2 | 0 | 39.2 | 2 |

| Impact of Nursing Intervention | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Health Condition | M | F | Q | D | √QD | CB | B2 | B3 = B1 - B2 |
| Myocardial Infarction | 6 | 5 | 1 | 7 | 2.7 | 1 | 52.2 | 6.0 |
| AIDS | 1 | 9 | 5 | 8 | 6.3 | 1 | 16.3 | .6 |
| Diabetes | 5 | 3 | 1 | 9 | 3 | .5 | 32.5 | 6.0 |
| Inguinal Hernia | 3 | 0 | 1 | 7 | 2.7 | 0 | 8.1 | 0 |
| Otitis Media | 8 | 0 | 6 | 4 | 4.2 | 0 | 39.2 | 0 |

| Integration of Burden of Illness and Importance of Nursing Intervention | | | | | |
|---|---|---|---|---|---|
| Health Condition | B4 | = | B1 | + B3 | RANK |
| Myocardial Infarction | 64.2 | = | 58.2 | + 6 | 1 |
| AIDS | 17.5 | = | 16.9 | + 6 | 4 |
| Diabetes | 44.5 | = | 38.5 | + 6 | 2 |
| Inguinal Hernia | 8.1 | = | 8.1 | + 0 | 5 |
| Otitis Media | 39.2 | = | 39.2 | + 0 | 3 |

**Burden Of Illness Formula**

M = magnitude of illness
F = case-fatality rate
Q = lost quality of life
D = duration of ill health
CB = concurrent burden

1. Is parameter without intervention
2. Potential improvement in parameter with intervention

Burden of Illness = M x (F + √QD + CB)

$B_3$ (change in burden of illness score as a result of nursing intervention) = $B_1$ (burden of illness) - $B_2$ (potential reduction in burden of illness as a result of nursing intervention)

## The Qualitative Element

By submitting all prevalence data reported by Statistics Canada under the seventeen chapters of the International Classification of Diseases to the process outlined above, we succeeded in producing an improved prioritized ranking of problems for nursing. This reliance on medical diagnoses, however, meant that the list was still insufficient for the purposes of building a comprehensive nursing curriculum. We therefore looked to other, more qualitative sources of health data.

Qualitative data which are particularly important to nursing are not usually disease specific (e.g. myocardial infarction). Instead, they relate to issues - such as smoking or teen pregnancy - that are not in themselves health problems, but that contribute significantly to future problems and the burden of illness of a community. For example, in the Hamilton-Wentworth community, we found that 34% of adolescents aged 16-19 are smokers. Typically, data related to the magnitude of these issues come from provincial or local surveys of health-related behaviours. The Health Profiles of the Citizens of Ontario Report (1987), for example, identifies 15 priorities (see Table III).

Many of these health-related issues cannot be quantified in the manner required by the formula described earlier. They can, however, be ranked in terms of their importance to the mission of nursing, which speaks to health promotion, prevention of illness and enhanced coping. In an attempt to find some degree of consensus about the relative priority of these problems, we sent this list to several nurse experts in community and population health and asked them to do their own ranking based on their experience and expertise. The education planners used these responses as a basis for prioritizing problems for nursing curriculum planning.

After applying both the quantitative and qualitative approaches to identifying curriculum content, we succeeded in finalizing a list of priority health issues to be used as the basis of discussion in our problem-based approach to learning (see Table IV). All of these health priorities are covered over the four years of the baccalaureate program.

## Conclusion: Advantages and Limitations

A key feature of the approach to prioritizing health problems for nursing curricula described here is its incorporation of a community perspective - the fact that it uses data from a variety of community sources as well as research literature and expert opinion. One advantage to this approach is that priorities for a nursing curriculum are not completely biased by the widespread prevalence of medically defined problems.

The fact that it uses a clearly defined process for curriculum decision-making is also an advantage, in that it becomes relatively easy to update the curriculum as new health data become available. This process encourages a planned approach to curriculum change, and

Table III. Health priorities as listed in health profiles of the Citizens of Ontario Report (1987)

1. Hypertension
2. Family planning
3. Prenatal and infant health
4. Immunization
5. Sexually transmitted diseases
6. Toxic agents/radiation
7. Occupational health/safety
8. Accident prevention
9. Dental health
10. Infectious diseases
11. Smoking
12. Substance abuse
13. Nutrition
14. Physical activity
15. Stress/family violence

Table IV. Priority health issues

Family planning/prenatal care/immunization
Nutrition
Substance abuse
Accidents
Osteoporosis
Sexually transmitted diseases
Cancer - breast (female), lung (male)
Smoking
Stroke
Ischemic heart disease
Depression/suicide
Diabetes
Alzheimer's disease
Family violence

provides for efficient and practical decision-making.

One of the limitations of this approach relates to the quality of the information available - in terms of accuracy and the extent to which it is up to date. As MacDonald et al identified, there is currently a heavy reliance on data which are based on medical diagnostic labels. They quite rightly point out that "an approach to priority setting which deals only with diagnoses will miss much of the richness of causal factors related to the health problem being evaluated." As an example, diagnoses related to chronic lung disease fail to identify underlying health problems such as smoking or occupational risks. This limitation should not preclude the use of available health data, but it underscores the critical need to use data from nursing sources, which frequently relate to health behaviours and do not rely on disease-based labels.

In 1989, MacDonald et al cautioned that the original formulation was not a "fait accompli" and that further work should be done on both the priority setting equation and the data that are put into it. In this submission we have shown how, with modifications, a formula that was originally targeted to medical education may also be useful to other health disciplines. We believe that this rational approach to decision-making using reasonably reliable data (both quantitative and qualitative) is an advance over methods such as academic consensus or expert survey.

The challenge for nursing curriculum planners who may wish to consider this approach is to promote the search for data about the quality of life associated with illness, and the effect of health promotion, as well as preventive, therapeutic and rehabilitative interventions. Further modifications to the formula may emerge as data sources improve.

## Chapter six: Revitalizing a Problem-Based Curriculum in Egypt: The "Bipolar" Approach

Suez Canal University


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# Revitalizing a Problem-Based Curriculum in Egypt: The "Bipolar" Approach

Suez Canal University

## Introduction

In the early 1980's, great efforts were made by the founders and initial staff members of Suez Canal University's Faculty of Medicine (SCU-FOM) to identify and prioritize the health problems in the surrounding community. Their goal was to structure a student-centred, problem-based curriculum that reflected the community's real health needs. That pioneering work gave the school a solid community-oriented grounding, and built enough momentum to carry the school through its first decade.

By the early 1990's, there was a clear need for a fresh look at the relationship between the curriculum and the community's needs. Instead of simply administering a "booster dose," the school decided to adopt a new method for prioritizing health problems in the four governates served by the school (Ismailia, Port-Said, Suez and Sinai), and for incorporating these health problems into the medical curriculum. This method was based on the recommendations made in the 1990 report that summarized the work of Task Force 2.

This submission outlines how the method was put into practice at SCU-FOM, and describes the various "home-made" ideas and innovations which made the approach more feasible and affordable. It highlights:

- the role of the "Problem Formulation Research Lab" in gathering health intelligence and in formulating strategies for incorporating the PHP analysis into curriculum reform;
- the contributions made by Faculty members, students, the Ministry of Health and the community through nine months of identifying and prioritizing health problems;
- the application of computer technology to analyzing priority health data and its incorporation into the curriculum.

## The Problem Formulation Research Lab

An SCU-FOM-based health intelligence unit called the "Problem Formulation Research Lab" played a key leadership and co-ordinating role in the curriculum update process. This unit was established in 1990 with a broad mandate to:

- identify and prioritize health problems in the community;
- put in place a process for periodically updating this information;
- develop appropriate and affordable strategies for incorporating this analysis into the school curriculum on an ongoing basis.

The Lab's activities include research both into health problems and into format options for problems that appear in the curriculum, analysis and evaluation of the problems used in existing curricula, and training of faculty in problem formulation and design. The Lab also documents its experience and exchanges its learnings with other community-oriented, problem-based schools through publications and visits.

## Retrospective Curriculum Analysis

In a dynamic, problem-based curriculum such as that followed by Suez Canal University, it can be difficult to get a clear picture of discipline content. In fact, one impetus for the curriculum reform project was the expressed dissatisfaction of the departments with content coverage in the problem-based curriculum. For this reason, one of the Lab's first activities was to design a computer program that would extract the content from the existing curriculum, sort it by discipline, and present it in such a way as to enable a review of the educational approach to each topic.

The problems which had been used in all six grades in the academic year preceding the project's start were checked according to their grade, order, title, problem identification, pre-set (faculty) objectives, learning (student-derived) objectives and the achieved educational activities. Each objective or activity was coded according to the relevant discipline (A for anatomy; S for surgery, and so on).

Each department was then asked to evaluate the results of the retrospective curriculum analysis in terms of how well it reflected the basic content which the undergraduate should ideally learn, from a discipline expert's point of view. The analysis showed that, for the most part, content was in fact being adequately covered in the curriculum.

## Community Health Problem Prioritization

At the same time, SCU-FOM was involved in an intensive process of data collection and analysis designed to find out which health problems were currently relevant in the local context - and to prioritize them. As the final report of Task Force 2 did not discuss in detail the respective roles that faculty from the scientific departments, students, health authority officials, and the community could play in the process of prioritization, SCU-FOM had to create its own procedures, while respecting the fundamental principles of the Task Force's work. Table I outlines the different roles played by all these groups. The nine months that it took us to deliver our "baby" involved long days of data entry and analysis, and nights of questionnaire design and interviews.

To avoid bias, the team made a conscious effort to forget what we already knew in terms of which health problems were being used in the current curriculum. We started to identify the health problems in our community "de novo," depending on the results of surveys done by the faculty staff and students, documents provided by the Ministry of Health, and

Table I. Health prioritization process - participant roles

| **PHP indices** | **Participants** | **Method** |
|---|---|---|
| Prevalence | Ministry of Health | Document |
| | Faculty general practitioners | Questionnaires |
| | Faculty students* | Surveys & Questionnaires |
| | - Community representatives (specialists were excluded from this index to avoid bias). | Interviews |
| Preventability | - Faculty specialists | Questionnaires |
| | - Faculty general practitioners | Questionnaires |
| | - Faculty students* | Questionnaires |
| | - Community representatives (to test the practicality of preventability) | Interviews |
| Treatability | - Faculty specialists | Questionnaires |
| Social and/or | - Community at large | Interviews |
| Economic Impact | - Medical sociologists | Questionnaires |
| | - Health economists | Questionnaires |
| | - Faculty students* | Research |
| National Programmes | - Health officials | Interviews |
| Morbidity & Mortality | - Ministry of Health | Statistics |
| | - Faculty specialist | Questionnaires |
| | - Faculty general practitioners | Questionnaires |
| | - Faculty students* | Surveys |
| Disability | - Faculty specialists | Questionnaires |
| | - Faculty general practitioners | Questionnaires |
| Impending future outbreak | - Faculty epidemiologists | Questionnaires |
| Prototype value | - Faculty educationalist | Questionnaires |
| | - Faculty students* | |
| Interdisciplinary input | - Faculty basic & Clin. scientists | Interviews |

*It is worth mentioning here that our Phase III students, who had experience in the community from the beginning of their educational program, were given the upper hand to choose the corner stones (problems) of their education plan as self-directed learners in a student-centred institution.

interviews held with general practitioners, community representatives and health officials.

Then, in order to prioritize these problems, we built a questionnaire that included all identified health-related problems in the surrounding community. We asked respondents to evaluate the randomly-displayed problems according to the following indices:

- prevalence
- preventability
- treatability
- burden of illness
- degree of disability
- impending future outbreak
- social and/or economic impact
- presence of a national program
- prototype value
- inter-disciplinary input.

The last two indices provide useful information for pedagogical purposes. A five-degree rating scale was given for each index.

Hundreds of questionnaires were collected and the data fed into a specially-designed computer program that summed up the scores of the indices for each problem and then ranked them in priority order. Five hundred and fifty-five health problems were identified and ranked. (Seven problems were deemed to be ranked in obviously unsuitable positions, and subject area experts were consulted in the re-ranking.) The top 20 health problems, together with their total score, are listed in Table II.[1]

When the results of the prioritization process and the retrospective curriculum analysis were compared, they indicated some imbalance in content, with focal gaps and overlaps. We found that some lower priority problems were repeated unnecessarily in the curriculum, while some top priority problems were missing from the school's educational problem list. Students were not obtaining some essential and relevant knowledge and skills in both basic and clinical sciences.

[1] For a list of the top 228 health-related problems in order of priority, see *Annals of Community-Oriented Education*, C. Engel, H. Schmidt, P. Vluggen, eds., Volume 8, 1995, 189-193.

Table II. Top 20 priority health problems

| | | |
|---|---|---|
| 1. | Bilharziasis | 195.60 |
| 2. | Malnutrition | 189.40 |
| 3. | Family planning | 184.20 |
| 4. | Water sanitation & sewage disposal | 183.00 |
| 5. | Hypertension | 182.50 |
| 6. | Diabetes mellitus | 182.50 |
| 7. | Addiction | 179.00 |
| 8. | Viral hepatitis, cirrhosis & hepatic failure | 178.80 |
| 9. | Diarrhoea & dehydration | 178.70 |
| 10. | Breast mass, rehab. anticipated dying | 178.00 |
| 11. | Poliomyelitis | 175.50 |
| 12. | Tuberculosis | 173.00 |
| 13. | Food pollution & poisoning | 169.00 |
| 14. | Hematurea (stone, cancer bladder) | 167.40 |
| 15. | Environmental pollution | 167.00 |
| 16. | Child abuse | 167.00 |
| 17. | Sore throat & tonsillitis | 166.20 |
| 18. | Anaemia | 165.70 |
| 19. | Ante-natal, post natal care | 165.00 |
| 20. | Scabies | 163.50 |

A planning approach that looked at each phase of the curriculum independently (phase one - pre-pathogenesis in year one; phase two - pathogenesis in years two and three; phase three - clerkships in years four to six) was identified as the main cause for this disharmony, and it was determined that *phasic* planning had to be replaced with *central* planning. The team proposed a *prospective* approach as a new strategy to solve these problems, and developed what we called the "Bipolar theory" - which stressed the need to fulfil both the school objectives and the discipline content pre-identified by the subject area experts.

## Using the Bipolar Theory to Build a "Circus Tent" Curriculum

The process of designing the new curriculum involved analyzing the top priority problems in such a way as to ensure that they covered all the faculty objectives (one pole) and all the basic disciplinary topics (the second pole), in order to avoid any gaps and overlaps in the curriculum. Again, a specially designed computer program assisted in the process of coding problems for discipline content and matching them against faculty objectives. We decided that in our curriculum it was feasible to include only the top 227 priority problems

in problem-solving sessions. The remaining 328 problems were acknowledged and considered in field activity planning.

At the end of the process, only a few objectives and disciplinary topics were left unmatched to a priority health problem. These were identified as pre-set objectives for a few non-priority problems that it was important to include for pedagogical purposes. For example, problems related to genetic disorders and forensic problems were not acknowledged as priority problems for the community, but have been incorporated into the curriculum for educational reasons.

The curriculum proceeds in a spiral, with top priority problems appearing more than once in order to ensure that they are covered in all their breadth and depth. Bilharziasis, the top priority problem, is dealt with three times: once to cover the life cycle of the parasite and the natural history of the disease; a second time to cover the pathogenesis of the disease (biharzial cystitis, colitis and periportal fibrosis); and a third time (in phase three) to deal

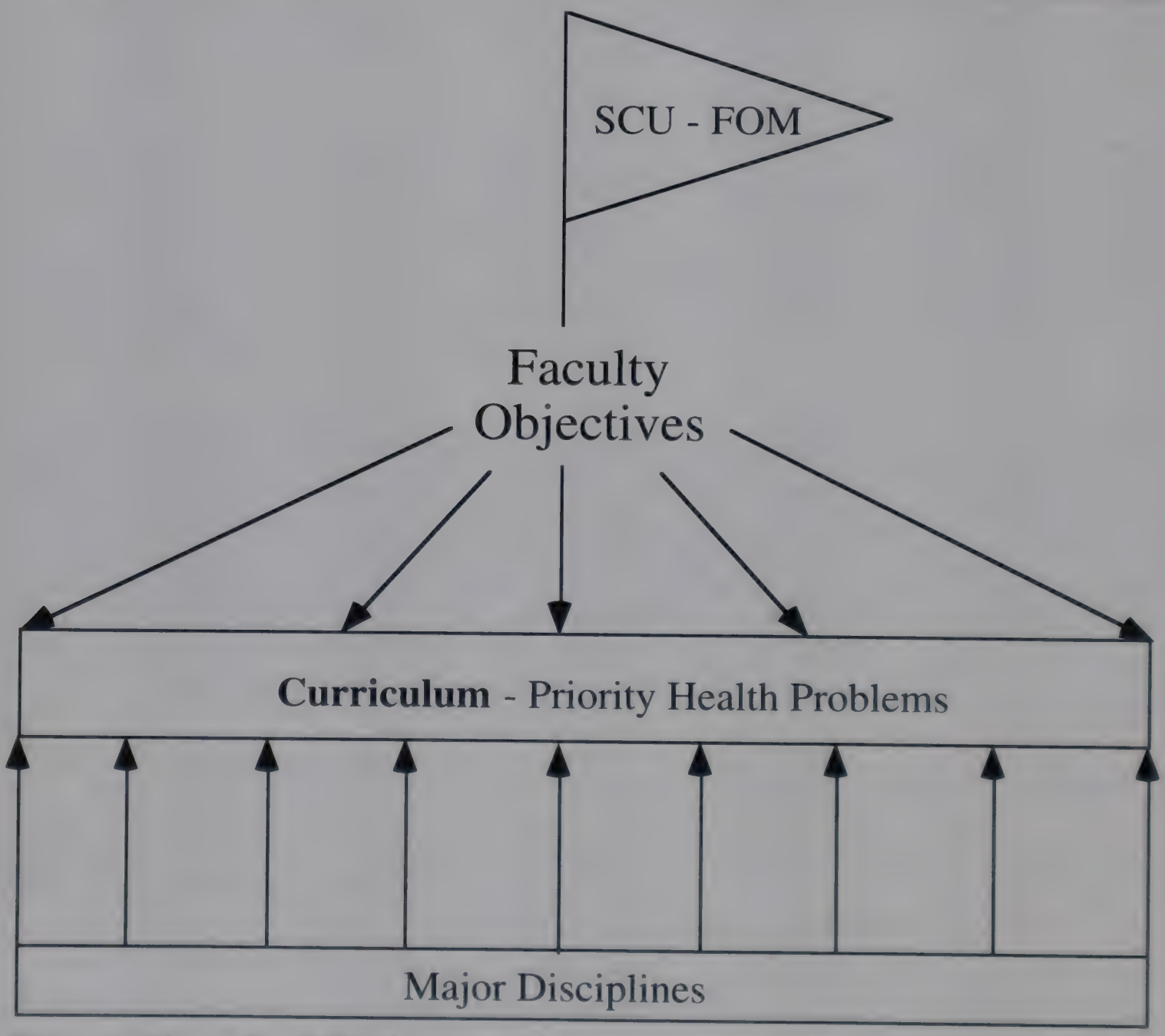


Figure 1. "Circus Tent" Bipolar approach to curriculum design

with a complicated case of bilharziasis that has hematemesis due to oesophageal varices, requiring surgical intervention. In contrast, a disease like warts (position 197) is dealt with just once in the curriculum. Some low-ranked problems are combined in one educational problem.

We call our curriculum a "circus tent" curriculum because it is based on three main pillars - the objectives, priority health problems and discipline content - which actively participate in a dynamic interrelationship (Fig. 1). Because this is a problem-based curriculum, the prioritized health problems constitute the main core of the curriculum. As it also an objective-oriented curriculum, the problems are distributed horizontally from grade one to grade six according to the specific objectives of each phase, grade and block. The discipline content shares in the plan through matching and cross-matching with the pre-set objectives of the prioritized problems. The pre-set objectives are derived from the specific objectives of each phase.

The application of computer technology makes it relatively easy to link the problems and their related educational activities with the disciplines. It also allows us to determine the respective weight that is being given to each discipline in the curriculum in each phase. Thus, this problem-based curriculum can be analyzed both as a discipline-based curriculum and as an objective-oriented curriculum - an advantage which allays the insecurities and reservations of many who are uncomfortable with the problem-based approach.

## Ongoing Updating of the PHP List

In our early enthusiasm during the first three years of the new PHP approach, we updated our list every year. Since then, we have decided that - barring the occurrence of an event that would have a major impact on our PHP list - it will be sufficient to update the list every three years. Compared to the original work of identification and prioritization, the update process is very simple. Copies of the questionnaire and final results are given to a sample of previous questionnaire respondents and a group of new participants. They are asked to re-rank the health problems on the list, add any new ones, and delete those which are no longer relevant.

Our experience to date has shown that there are not many changes from year to year, but those that there are can be very significant. AIDS is a good example. During the initial round of the PHP exercise, AIDS ranked so low in priority that it was almost off our scale. One year later, it had reached position 95. It is now in position 43, and is expected to go higher.

We believe that it is important for a curriculum that purports to be community-based to be able to respond quickly to this type of change in priority.

## Reflections on the Suez Canal University Experience

We chose a difficult time to carry out this exercise. We changed deans during this period. Some of the suspicion and reluctance to participate exhibited by a few faculty members may be traced to a feeling of vulnerability at this time, and a fear that innovations would not move forward under a new dean. This fear proved to be unfounded and rapidly disappeared - for good, we hope.

The school was financially self-dependent at this time, receiving no foreign funds. We experienced some financial problems, but felt confident that we could manage on our own. The computer hardware and software were easily affordable, thanks to current low prices.

Designing a dynamic program capable of quickly adjusting to reflect changes in the regional health map was our main concern. After several trials and errors, we succeeded in developing a program with a built-in mechanism for returning balance to curriculum content after every change in the priority health problems list.

We believe that our curriculum reform process has succeeded in:

- helping the school shift from phasic (or even individual) planning into central, cooperative planning;
- encouraging faculty to share in decisions about the school curriculum - thus alleviating past frustrations, and building a higher level of comfort with problem-based learning;
- fostering student-centred activities through the participation of students in the planning of their own curriculum;
- building a curriculum that better prepares students for their future careers, through greater exposure to priority health problems;
- designing computer-based applications that facilitate annual curriculum planning by providing better documentation, easy feedback, evaluation and updating;
- encouraging community participation in health professional education;
- strengthening the relationship between the university and the health authority, through the exchange of information.

## Acknowledgements

We wish to thank Prof. Zohair Nooman and Prof. Esmat Ezzat, who founded the Faculty of Medicine of Suez Canal University as a pioneering school in innovative medical education, and who encouraged the "second generation" to continue to promote this institution through creative ideas and continuous hard work.

Our thanks are also extended to our colleague Dr. Amr Hassan, who gave us all the help needed in the early phase of this work.

## Conclusion
## What Has Been Learned?


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# What Has Been Learned?

## The Institutional Strategies

In the introduction to this monograph, we indicated that the goals of the Task Force on Priority Health Problems in Medical Education (TF2) were:

- to develop analytic tools to help the faculties of health sciences in educational institutions identify the major health problems of the region served by them, and to display these in a prioritized, scientifically valid and understandable fashion;
- to develop strategies for incorporating this analysis of priority health problems into the curricula of medical schools.

The submissions produced for this monograph by the participating institutions suggest that the process of pursuing these objectives, as well as the nature of activities undertaken in response to TF2, have varied substantially from one institution to the next:

- The submission from Gadjah Mada University (Indonesia) focuses on the establishment of infrastructure for communication, consultation, computer conferencing, continuing education and distance learning.
- University of Ilorin's account (Nigeria) highlights the integration of a priority health problem approach into their community-based medical education program, and suggests a potential role for students on community postings in improving the baseline of data used for prioritization purposes.
- Submissions from Chulalongkorn University (Thailand) and the School of Nursing at McMaster University (Canada) give accounts of how the analytic tool for health problem prioritization originally formulated by MacDonald et al in 1989 was adapted and applied to real-life curriculum change processes in two very different settings.
- The Suez Canal University submission (Egypt) describes a process of collaboration among faculty members, students, the Ministry of Health and the community in identifying and prioritizing health problems. It also outlines a model of curriculum development that is based on a dynamic interrelationship among faculty objectives, priority health problems and discipline content.
- The story of McMaster University's Health Priorities Analysis Unit shows how an intelligence unit originally intended to focus on making information on community health priorities available to education planners and researchers within the Faculty of Health Sciences is now actively linking the university with health policy makers, health delivery services and a wide range of community groups.

## Emerging Lessons

Despite these differences in focus, the accounts suggest several emerging themes and lessons. The importance of ensuring that the design of curricula for the education of health

professionals reflects the actual priority health needs of the communities served by the educational institutions is a "given" in all these submissions. So is the importance of applying some kind of clearly-defined process for prioritizing health problems to the curriculum reform task. A systematic framework is necessary in order to avoid (in the words of the McMaster School of Nursing submission) the "laborious process, marked by conflict and hours of endless circular debate" that is likely to occur when curriculum reform is based solely on the personal intuition and opinion of individual planners.

***Flexible Use of Formulae***

The analytic tool developed by MacDonald et al in 1989 has proven to be a useful starting point for two of the institutions represented here (Chulalongkorn and the McMaster School of Nursing), and a third (Ilorin) expects to migrate to a system that is aligned with MacDonald's in future prioritization efforts. It is interesting to note that three of the contributors to the development of priority setting approaches for educational planning (MacDonald, Chongtrakul and Arthur) use somewhat different factors in the formulae which they each use in their work.[1] All include the variables of magnitude, case-fatality, quality and time. MacDonald adds several variables: urgency, prevalence, diagnosis and therapy. Arthur incorporates the idea of "therapy" (in this case, a nursing intervention), by calculating a "$B_3$" factor - which is the difference in the burden of illness for a given condition before and after a (nursing) intervention. It will be useful, at some point, for the workers in this field to come together in order to work toward some agreement about definitions, abbreviations, selection of variables and combinations of variables. In the meantime, there is agreement about the basic intent, which is to help educational planners use a systematic, more objective approach to the selection of curriculum content - an approach which is based on an analysis of actual health problems to be addressed by health professionals.

Suez Canal University chose to create a different tool that incorporates some of the same indices, but uses them in a different way. The questionnaire that they built asks respondents to evaluate randomly-displayed problems according to ten indices (including "prototype value" and "interdisciplinary input," specifically added to reflect the pedagogical purpose of the exercise), using a five-degree rating scale.

The experience of all these institutions has been that the results of the prioritization exercise are largely dependent on the type and quality of data used. The difficulty of obtaining data that is comprehensive and up-to-date is a recurring theme that appears in different variations in individual accounts. At Ilorin, planners are using data that represents only the utilization of health resources. In addition to expressing concerns about the

[1] The MacDonald et al model is set out in the article attached as Appendix B; Chongtrakul's in Chapter Four of this monograph; and Arthur's in Chapter Five.

reliability of the data, they recognize that it may not adequately reflect the real burden of illness in the community, since many people may not seek medical attention. The original prioritization exercise carried out at Chulalongkorn relied on data from the 1983 *Notifiable Diseases Summaries* of the Thai Ministry of Public Health. Because this data was restricted to standard infectious diseases, important health problems such as trauma were left out altogether.

While McMaster's School of Nursing had ready access to relatively comprehensive quantitative information on incidence, prevalence and case fatality rates, they found that they needed to come up with a process for gathering more qualitative sources of data. The quantitative data with which they were working relied on medical diagnoses, while the practice of nursing relates to issues that are not in themselves medical problems (smoking, teen pregnancy), but that contribute to the burden of illness in a community.

The overall lesson from this experience seems to be that formulae for analyzing and prioritizing health problems are useful tools which work best when applied with sufficient flexibility to take both quantitative and qualitative data - including the judgement of experts in the field - into account.

***Structures which Reflect Function***

The accounts from Suez Canal, McMaster and Gadjah Mada Universities all stress the usefulness of establishing a formal structure to gather, analyze and report health intelligence. The focus in the Suez Canal submission is primarily on the role of the "Problem Formulation Research Lab" in supporting curriculum reform. The experience in the McMaster context has been that an HPAU with a sole focus on providing baseline information for curriculum planning may not be viable. While this was the McMaster HPAU's original mandate, it now states its role more broadly as analyzing the abundance of health-related data available relating to the region, communicating it to a wide range of stakeholder groups in a form that is useful and easy to understand, and working with these stakeholders to assess how the data can best support effective programming and positive change. It has also begun to take on an educational role within the Faculty of Health Sciences, through its involvement in the creation of a "Community Health Measurement" course.

The HPAU at Gadjah Mada has an even broader mandate, and it has been deeply involved in providing continuing education for practicing health professionals in data collection, information management, data analysis/interpretation, health priority identification, problem-solving and program evaluation.

***Role of Computer Technology***

The Gadjah Mada story highlights a theme that appears briefly in some of the other accounts: the use of computer technology to support curriculum reform. The radio-linked

computer telecommunications infrastructure that now links the HPAU with sixteen sites in central Java is the central vehicle for communicating essential health data, enabling the continuing education programs, and encouraging consultation among the various partners in the network on how to address the priority health problems identified.

The submission from Ilorin also mentions that participation in Task Force 2 has enabled faculty at that institution to engage in ongoing interaction and research with colleagues in other parts of the world via a link with the Internet. Establishing a means of regular communication was a major breakthrough for this institution, which is located some five hours' drive from Lagos on roads that are not travelled at night, and where a single international telephone line is shared by sixteen people.

At Suez Canal University, computer technology was put to use in analyzing priority health data and its incorporation into the curriculum. The fact that a specially-designed computer program has made it a simple matter to analyze the new problem-based curriculum both as a discipline-based curriculum and as an objective-oriented curriculum has managed to overcome the reservations of some who are uncomfortable with the problem-based approach.

***Building Links***

Running through all the accounts is the importance of building strong links with health service deliverers and the community in general: recognizing them as key sources of information on community health problems; involving them in the process of gathering information and implementing community-based curricula; creating mechanisms for information-sharing and joint planning on an ongoing basis.

## Directions for Future Research

On a very practical level, the stories point to the need for financial resources to carry out the reforms - and the frequent difficulty in ensuring a sufficient ongoing level of funding. They show clearly that a few motivated and informed individuals can make a substantial difference: in each case only a few faculty members were direct participants in TF2 and in the initiatives which have been carried on since the "formal" end of the project. At the same time, they stress the importance of getting high-level support from the Dean and Associate Dean of Education (or equivalent), as well as the acceptance and cooperation of other faculty members. It is often difficult for faculty to adjust to major curriculum change, and development opportunities must be built into the plan.

That said, the submissions generally concentrate on data collection, analysis, and dissemination. They are for the most part rather silent on the strategies developed for implementation of curricula based on priority health problems, as well as on the impact of

the initiatives to date. In many of the institutions reporting here, a process of curriculum change was already underway when the TF2 project began. While each of these accounts touch to a greater or lesser extent on how TF2 approaches influenced the direction of reform, there is still more to be told. Did the TF2 participants need to convince other faculty members involved in the education programs of the value of using health data as a basis for curriculum planning? If so, how was this accomplished? How were curriculum changes actually achieved? How are the curricula continuing to evolve? How successful have health problem prioritization approaches been in improving curricula? What impact has this work had on students and faculty? What plans are in place to evaluate initiatives over time? More detailed answers to these questions, based on the experience of these and other institutions, would be of enormous benefit to others involved in reform of the education of health professionals. Work is continuing on the documentation of this information.

Still, the institutional stories told here represent a valuable first step in filling a significant gap in the literature. We noted in the introduction that there is an extensive literature on priority-setting methods and initiatives in general, but very little published material on the application of these methods to medical education and to the education of health professionals in general. These submissions are clear evidence that the concepts of health problem prioritization can be - and are being - successfully applied in academic settings in very different parts of the world. It is our hope that the publication of this monograph will encourage these and other institutions to continue to share widely their successes, their challenges, and the lessons they've learned.

## Appendices

A. The Literature on Priority Health Problems in the Education of Health Professionals: A Selected Annotated Bibliography 99

B. "Setting Educational Priorities for Learning the Concepts of Population Health" (the seminal 1989 article by P. J. MacDonald et al, reprinted from *Medical Education*, 23, 429-439). 107

# Appendix A

## The Literature on Priority Health Problems in the Education of Health Professionals: A Selected Annotated Bibliography*

**Andersson, N. R. & Schilling, R. S. F. (1992). Occupational epidemiology in developing countries. In: Jeyaratnam J. (ed.)** ***Occupational health in developing countries*****. New York: Oxford University Press, p. 169.**

This is an in-depth description of occupational health data collection and analysis, including discussion of sentinel site surveillance methodology (pp. 192-4) and statistical techniques to incorporate quantitative methodology with non-parametric and qualitative information (pp. 203-10).

**Archampong, E. Q. (1990). Relevance and resources in medical education: An African view.** ***Medical Education 24:*** **6-10.***

The worldwide economic crisis enjoins all planners of social services to a principle of relevance and efficiency in the deployment of scarce available resources. On the continent of Africa, the compelling influence of natural disasters and the population explosion makes this more crucial. In the field of medical education, relevance implies commitment of training programmes to the health needs of the society. In Africa this means addressing crude birth rates of 46 per 1000, death rates of 22 per 1000, maternal mortality of 17 per 10 000, infant mortality of 112 per 1000 and a life expectancy of just under 50 - the most dismal health indicators of any of the world's continents. The training of the African doctor should therefore ensure intimate familiarity with the environmental and sociocultural influences on health, placing a premium on capability for management of human, material and financial resources, and a plan for team-work. It must also inculcate an appropriate learning strategy - one which emphasizes the searching and enquiring mind, and applying this problem-solving attitude to the life-long practice of medicine. It is now accepted by most observers that these objectives are achievable most readily through a translation of the principles of primary health care into educational strategies. The planning of medical educational policy in Africa is a formidable task, as it is to be done against a background of diminishing resources in real terms and the modern explosion of knowledge in science and technology.

*An asterisk identifies those annotations which quote authors' notes.

**Brownell Anderson, M. (1993). Medical education in the United States and Canada revisited. *Academic Medicine 68* (6) Supplement 2: S55-S67.***

This article comments on 11 tables that compare a wide variety of basic data from the early 1980s and early 1990s concerning medical education in North America. The data and accompanying analysis illustrate certain dramatic shifts in the medical school culture over the decade, such as a significant increase in the number of faculty members and the increasing reliance on medical services - rather than education subsidies - to provide revenue for medical schools. They make clear how little change has occurred over the decade in the way medical schools educate their students. For example, the increase in the number of clinical faculty has not resulted in greater attention to students' education. The principal method of preclinical instruction continues to be the lecture, and there has been little change in the number of weeks of required clerkships or the disciplines that require clerkships. This study substantiates many of the observations from U.S. and Canadian medical schools that were gathered in the ACME-TRI survey and reported in a document entitled "Educating Medical Students."

**Evans, J. R. (1992). The "Health of the Public" approach to medical education. *Academic Medicine 67* (11): 719-723.***

The author examines the growing discontinuity between medical education and the general health needs of society. He explains and illustrates this failure of the academic medical centre in several ways: by a parable; by reporting the results of his informal survey of faculty and residents; by presenting the findings of an international conference on medical education; and by giving a detailed description of the design and impact of the "Health of the Public" program, launched by the Pew Charitable Trusts and the Rockefeller Foundation in 1986. He maintains that there is an imbalance in the training of physicians and other health professionals because academic medical centres are dominated by supply-side thinking. Supply-side thinking is driven by new knowledge and technology and the resulting need to find patients to fit the interests as well as the technical capabilities of specialists and the equipment and services of hospitals. Academic medical centres have under-emphasized demand-side thinking, which concerns the patient and the health expectations, needs, and trends in the community. The author maintains that academic medical centres can continue to achieve the recognition they seek, but can do so by making the changes needed to better balance the driving forces of supply and demand. Only by doing this will they fulfil their fundamental mission of fostering the health of the public.

**Garrard, J., Hausman, W., Mansfield, E. & Compton, B. (1988). Educational priorities in mental health professions: Do educators and consumers agree? *Medical Education 22*: 60-66.***

This article provides empirical comparisons of priorities of consumers and educators in university-based programmes in psychiatry, psychiatric nursing and social work. Data resulted from a Q-sort of 200 objectives for mental health education. The results of the tests of validity and reliability of the instrument are described, followed by a discussion of the similarities and differences among the four subject samples: consumers, and educators in the three mental health professions. Suggestions for applications of this methodology by inter- and intradisciplinary service providers are described.

**Hadorn, D. C. (1991). The role of public values in setting health care priorities. *Social Science and Medicine 32* (7): 773-781.***

Public values must play a substantial role in any attempt to deal with the health care resource allocation problem. This article examines how preferences for the health outcomes of care (e.g., improved or worsened physical suffering) can provide a coherent basis upon which to set explicit health care priorities. Preferences for health outcomes could be mapped onto information concerning the outcomes expected from the specific health services when used for particular clinical conditions. These "preference-weighted" outcomes would determine the relative priority given to health services for each specific condition. Generic outcome measures would be used in order to permit comparison of benefits and harms across different services. The article argues that allocation rules cannot be based on individual patients' preferences. Instead, average population preferences should be used to evaluate the relative importance of services - as occurs in other insurance contexts - despite theoretical concerns about the aggregation of preferences. Patients' preferences might also be estimated by reference to relevant demographic factors, but only if population subgroups are identified with relatively homogeneous preference patterns, and if the use of such subgroups is deemed socially acceptable. Concerns about stereotyping and discrimination might limit the tractability of this approach.

**Macdonald, P. J., Chong, J. P., Changtrakul, P., et al. (1989). Setting educational priorities for learning the concepts of population health. *Medical Education 23*: 429-439.***

Following the World Health Organization's policy of "Health for All by the Year 2000," doctors are increasingly being seen as health care providers to populations of patients, in addition to their more traditional role as doctors to individuals in a one-to-one encounter. In order for doctors to take on this expanded role, they must learn the knowledge and skills appropriate to population health. In this paper, we propose

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a method of educational priority-setting which allows educational planners to identify those diseases and adverse health conditions most appropriate for studying the concepts of population health. With the Measurement Iterative Loop of Tugwell and colleagues as a framework, a table of Priority Illness Conditions was developed and compared with a previous priority list developed from a survey of clinical teachers at the McMaster University Medical School. Discussion of the implications of this approach in setting educational priorities at undergraduate, postgraduate and continuing medical education levels is presented, along with a review of possible shortcomings and caveats in using this approach.

**Morrow, R. H. Jr. & Lansang, M. A. (1991). The role of clinical epidemiology in establishing essential national health research capabilities in developing countries. *Infectious Disease Clinics of North America* 5 (2): 235-246.***

The Commission on Health Research for Development (CHRD) has pointed to the critical importance for all countries, no matter how poor, to have the capacity to carry out the research needed to define their own health problems and to work out affordable solutions for these problems. The core requirements for essential national health research (ENHR) include the national capacity for (1) assessing the health status of the population; (2) setting priorities for rational resource allocation to and within the health sector and for the national health research agenda; and (3) using evaluation tools for process appraisal, outcome assessment, and cost-effectiveness. The capacity to conduct such research must be accompanied by the will to use the results; the researchers must work in concert with the decision makers. Such health research requires multidisciplinary expertise, particularly involving skills in epidemiology, economics, and the social and management sciences. However, these skills remain in very short supply in virtually all developing countries even as compared to other needed disciplines; the lack of personnel with such training will be the greatest obstacle to the achievement of ENHR in most nations. A variety of efforts to build such expertise have been attempted during the past decade. One of the most promising has been the establishment of a network of clinical epidemiology units (CEU) in developing countries. Some units have reached a critical mass of epidemiologic, economic, and social science expertise and are beginning to assume responsibility for research and training in their home country. Although the location for their training to this point has largely been in academic tertiary hospitals in technically advanced countries, in several CEUs the skills that have been developed have been turned increasingly to important national health issues. In this article, we review the key role that ENHR must take to advance the effectiveness of health planning and decision-making in the poor countries; the essence (and the assorted images) of clinical epidemiology as it is evolving in many developing countries; the urgency (and possible approaches) to develop appropriate research training programs to meet the needs for ENHR; and the potential for (and constraints

upon) the International Clinical Epidemiology Network (INCLEN) as an important contributor to the expertise required for ENHR.

**Murray, C. J. (1990). Rational approaches to priority setting in international health. *Journal of Tropical Medicine and Hygiene 93*: 303-311.**

This paper was originally commissioned to provide background information for the Commission on Health Research for Development, an independent international initiative established to define and promote advances in research that will improve health in developing countries. The Commission's members - experts in health and development who represent twelve different nations, most of them in the developing world - are working to set an international agenda that will help national governments, donors, and international health agencies strengthen health research for action. The purpose of the article is "to show that scientific or quantitative priority setting techniques are constrained by three factors: (1) the empirical information base; (2) choices that cannot be empirically resolved, including, (a) designing a health indicator (b) levels of categorization and problem definition (c) society's time preference; and (3) local patterns of health problems and resources for addressing these problems." It provides in table form: (1) International health initiatives; (2) Estimated number of deaths by cause in the developing world; (3) Hypothetical comparison of different diseases using alternative indicators .

**Neufeld, V. R., Maudsley, R. F., Pickering, R. J., et al. (1993). Demand-side medical education: Educating Future Physicians for Ontario. *Canadian Medical Association Journal 148* (9): 1471-1477.***

Initiated by Associated Medical Services (AMS), Educating Future Physicians for Ontario is a 5-year collaborative project whose overall goal is to make medical education in Ontario more responsive to that province's evolving health needs. It is supported by AMS, the five universities with medical schools or academic health sciences centres, and the Ontario Ministry of Health. The project's five objectives are to (a) define the health needs and expectations of the public as they relate to the training of physicians, (b) prepare the educators of future physicians, (c) assess medical students' competencies, (d) support related curricular innovations and (e) develop ongoing leadership in medical education. There are several distinctive features: a focus on "demand-side" considerations in the design of curricula, collaboration within a geo-political jurisdiction (Ontario), implementation rather than recommendation, a systematic project-evaluation plan, and agreement as to defined project outcomes, in particular the development of institutional mechanisms of curriculum renewal as health needs and expectations evolve.

**Neufeld, V. R., & Spasoff, R. A. (1991). The potential and organization of Health Intelligence Units. In: K. L. White & J. E. Connelly (eds.). *The medical school's mission and the population's health.* New York: Springer-Verlag, pp. 113-131.**

The authors argue that in order to meet the university's responsibility to help society deal with present and future problems, medical schools "require a capacity for the analysis and interpretation of health information" that is useful in formulating policies relevant to health of the people and allocation of public and private resources to meet these needs. The authors present a model of "Health Intelligence Units" that would provide the capacity to gather and analyse relevant data. They describe the experience of initiatives at McMaster University and the University of Ottawa, as well as the Educating Future Physicians for Ontario (EFPO) project. The book concludes with a discussion section (Lord Butterfield; Harry S. Jonas; Lionel E. McLeod; General Discussion).

**Reassessing priorities: Identifying the determinants of HIV transmission (1993). *Social Science and Medicine 36* (5): iii-viii.**

This editorial comments on the biomedical advances related to AIDS and HIV and contrasts this with the lack of a sufficiently broad orientation (i.e., social, historical and cultural context) to make prevention campaigns effective. It includes a discussion of the need for a more critical and multidisciplinary understanding of HIV transmission and a multisectoral approach to responding to it (e.g., using appropriate social science and community-based inputs).

**Shapiro, M. C., Shapiro, R. A. & Ubolcholket, S. (1992). Medical education in Thailand. *Medical Education 26*: 251-258.***

In order to make training more relevant to community needs, medical educators throughout Thailand have been attempting to address issues concerning the training of their undergraduates. Support for a reorientation of medical education and acceptance of the framework put forward by the World Health Organization are evident in national health plans and in national medical education conferences. This paper outlines some of the basic problems faced by health policy makers in Thailand and presents a brief chronology of recent events in the history of medical education in Thailand.

**Stein, R. E., Gortmaker, S. L., Perrin, E. C., et al. (1987). Severity of illness: Concepts and measurements. *The Lancet* , December 26: 1506-1509.***

Although it seems intuitively clear that diseases vary in severity, references to severity in published reports are inconsistent and vague. Most imply that it is quantifiable and that it reflects a biological absolute. The term is used to describe concepts as diverse

as the underlying biological defect, the amount of illness or disability caused by a condition, the condition's impact on quality of life, and the financial, social, or emotional burden imposed by the illness. These notions sometimes overlap, but often they hardly relate to one another at all. This paper has four aims: to clarify some of the constructs of severity of illness and propose a new framework for classifying existing measures; to examine issues in the assessment of all forms of severity; to assess the implications of different types of severity for clinical care and research; and to recommend steps that would improve progress in this area. Many examples are taken from paediatrics, but the ideas and concepts apply across all ages.

**Walsh, J. A. & Warren, K. S. (1979). Selective primary health care: An interim strategy for disease control in developing countries. *The New England Journal of Medicine 301* (18): 967-974.***

Priorities among the infectious diseases affecting the three billion people in the less developed world have been based on prevalence, morbidity, mortality and feasibility of control. With these priorities in mind, a program of selective primary health care is compared with other approaches and suggested as the most cost-effective form of medical intervention in the least developed countries. A flexible program delivered by either fixed or mobile units might include measles and diphtherial-pertussis-tetanus vaccination, treatment for febrile malaria and oral rehydration for diarrhoea in children, and tetanus toxoid and encouragement of breast feeding in mothers. Other interventions might be added on the basis of regional needs and new developments. For major disease for which control measures are inadequate, research is an inexpensive approach on the basis of cost per infected person per year.

# Appendix B

## Setting Educational Priorities for Learning the Concepts of Population Health*

P.J. MacDonald†, J.P. Chong‡, P. Chongtrakul§, V.R. Neufeld¶, P. Tugwelld, L.W. Chambers‡$, R.J. PickeringÂ & Mary Jane Oates¶

†Department of Family Medicine, ‡Department of Clinical Epidemiology and Biostatistics, $Teaching Health Unit Project, ÂHealth Priorities Analysis Unit, ¶Faculty of Health Sciences, McMaster University, Hamilton, Ontario and §Department of Pharmacology, Chulalongkorn University Bangkok

### Summary

Following the World Health Organization's policy of "Health for All by the Year 2000", doctors are increasingly being seen as health care providers to populations of patients, in addition to their more traditional role as doctors to individuals in a one-to-one encounter. In order for doctors to take on this expanded role, they must learn the knowledge and skills appropriate to population health. In this paper, we propose a method of educational priority-setting which allows educational planners to identify those diseases and adverse health conditions most appropriate for studying the concepts of population health. Using the Measurement Iterative Loop of Tugwell and colleagues as a framework, a table of Priority Illness Conditions was developed and compared with a previous priority list developed from a survey of clinical teachers at the McMaster University Medical School. Discussion of the implications for this approach in setting educational priorities at undergraduate, postgraduate and continuing medical education levels is presented, along with a review of possible shortcomings and caveats in using this approach.

Key words: community medicine/*educ; *curriculum; education, medical; Ontario

### Introduction

In the 19th century, major advances in health resulted from an emphasis on the provision of clean water, sanitation, and adequate food supply, as well as the amelioration of overcrowded living conditions. In contrast, 20th century approaches to health and disease have studied the physiological and biochemical basis of disease in depth.

*This paper was published in Medical Education, 23, 429-439, 1989, and is here reproduced with the kind permission of the author and the editor.

Harper (1986) defines population health as an integration of the environmental and individual approaches to health and disease, and states that the purpose of population health is to improve the health of all individuals. It follows that the goal of medical education is to train doctors who will contribute maximally to the alleviation of the burden of ill health in their communities (Neufeld, 1988). Most doctors see and treat patients in a serial fashion, one at a time. Yet populations are composed of individuals, and it is on this population perspective that there is growing worldwide emphasis. Perhaps the best-known statement of this emphasis is the World Health Organization's resolution of 'Health for All by the Year 2000' (WHO 1981).

Medical education in the 20th century has concentrated on providing students with an in-depth understanding of the physicochemical basis of disease, while generally de-emphasizing the population-related aspects of health. Recently, the GPEP report (Project Panel on the General Professional Education of the Physician, 1984) called for fundamental changes in the process of medical education. Among these proposed changes was an accentuation of education concerning the health of populations. In particular, Recommendation 4 under 'Purposes of General Professional Education' states: 'Medical students' general professional education should include an emphasis on the physician's responsibility to work with individual patients and communities to promote health and prevent disease'.

Doctors are trained to treat and prevent diagnosable diseases, while much of the burden of illness in a population's related to non-diagnosable 'ill health' and suboptimal functional status. The taxonomy of diseases, in particular the International Classification of Diseases (ICD), is inadequate to describe in a complete-enough fashion the burden of illness (White, 1985).

Tugwell et al. (1985) described a conceptual framework, the Measurement Iterative Loop, by which a health problem can be described in broader terms of population health. Originally proposed as 'a framework for the critical appraisal of need, benefits and costs of health interventions', the Measurement Iterative Loop (Fig. 1) may also be used as a basis for the setting of educational priorities and as a tool for understanding the broader, population-based implications of a wide variety of diseases and adverse health conditions. Tugwell et al. applied this approach to the problems of hypertension and osteoarthritis in their original paper, while Pickering et al. (1987) used the Loop as an educational model for health promotion and the role of the doctor in the problem of smoking cessation.

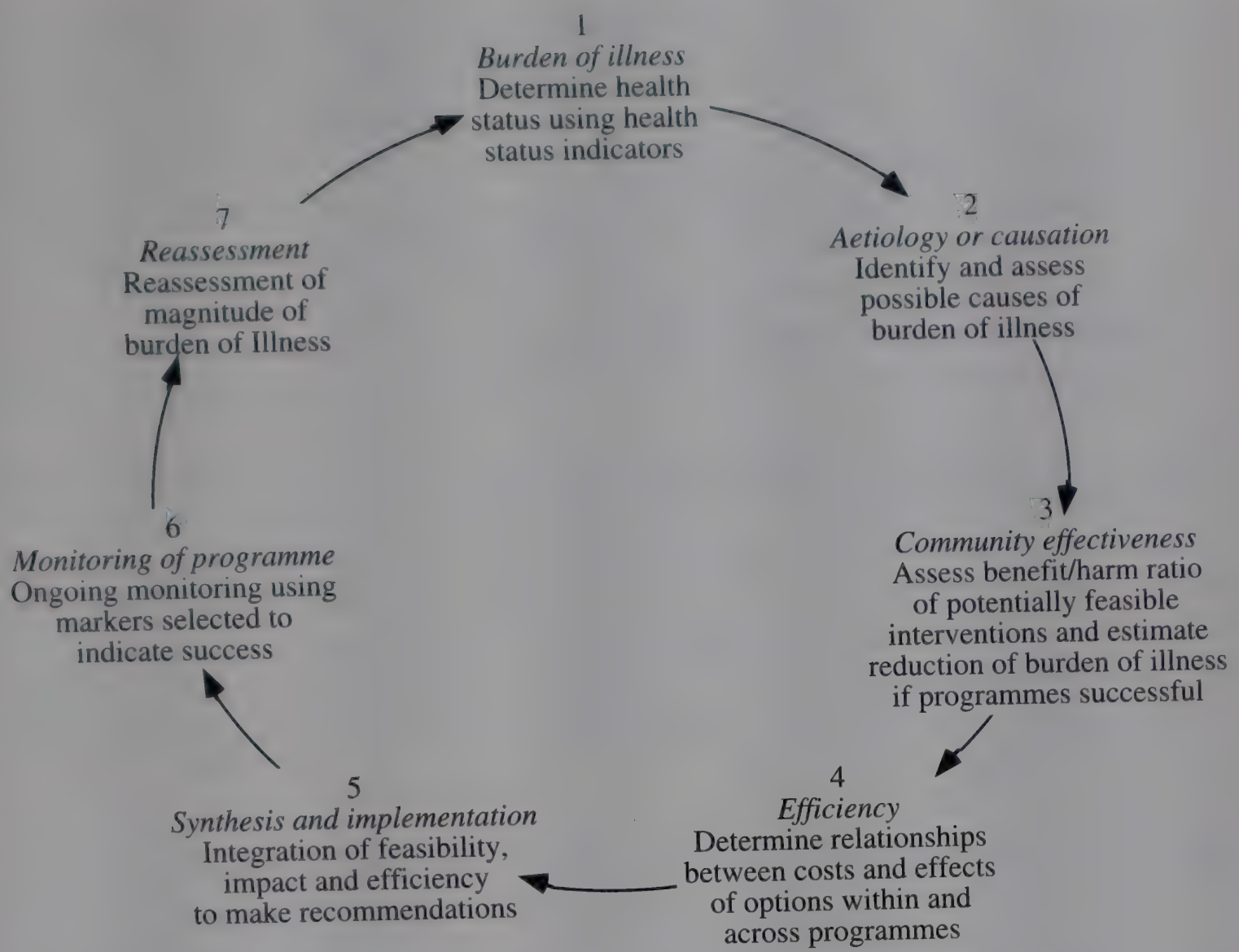
1
*Burden of illness*
Determine health status using health status indicators
2
*Aetiology or causation*
Identify and assess possible causes of burden of illness
3
*Community effectiveness*
Assess benefit/harm ratio of potentially feasible interventions and estimate reduction of burden of illness if programmes successful
4
*Efficiency*
Determine relationships between costs and effects of options within and across programmes
5
*Synthesis and implementation*
Integration of feasibility, impact and efficiency to make recommendations
6
*Monitoring of programme*
Ongoing monitoring using markers selected to indicate success
7
*Reassessment*
Reassessment of magnitude of burden of Illness

Figure 1. The Measurement Iterative Loop

The doctor's role in health care is indeed changing, particularly that of the primary care doctor. Neufeld et al. (1989) have pointed out the roles which a primary care doctor may undertake:

1. Care provider for individual patients: This is the time-honoured, traditional role of doctors, serving individuals who seek care.
2. Care provider for a population: This is an extension of the provision of care, not only to those who seek it, but also to those who do not, or cannot seek care, but who are part of a defined health care population. An example might be a family doctor with a 'list' of patients or potential patients; or a primary care doctor responsible for a primary care unit.
3. Educator: Being available to individuals and groups in the community as an 'expert' consultant in matters of health and illness. Further, doctors could be proactive educators, taking the initiative to provide well-communicated, scientifically-based health information to the general public, and to special interest groups.
4. Advocate: Taking responsibility, as an informed and concerned citizen, for a special 'cause' designed to improve the health of the public (for example, being an advocate for seat-belt legislation).

5. Manager: In some situations, doctors find themselves responsible, not only for their own actions, but also for those of other health workers. This calls for special skills in the facilitation of team-work, in leadership development, in health systems evaluation and resource allocation.
6. Researcher: Increasingly, doctors can be expected to provide documentation of their work, primarily for the purposes of financial auditing and professional audit/feed-back. With the advent of computerized record systems, it is highly likely that practising doctors could contribute quantitative information, not only for the purposes of describing their own practices, but also for the analysis of health patterns and practices in a region.

How can doctors be better trained to serve the health needs of populations, not just individuals? The curriculum of a medical school, almost by definition, outlines those aspects of health and disease which the teaching staff feels are educational priorities. In a problem-based learning environment, the health problems chosen for study define the basis of the curriculum; the way in which problems are studied (e.g. from the perspective of organ systems) defines the curricular emphasis. Given the immense variety of health problems which could be studied, educational planners need a method for choosing which problems to include in a curriculum.

The first step in establishing educational priorities is to determine those factors of a health problem which are indices of its importance. A widely accepted index of importance is the prevalence of the problem in the population under consideration. The University of Ottawa reported its attempts to base its medical curriculum mainly on an index of prevalence (Rosser & Beaulieu, 1984). The McMaster Priority Problems and Conditions Survey looked at prevalence, but also considered educational priorities (clinical logic, prototype value, urgency, treatability, and interdisciplinary input) (Chong et al. 1984). In the context of quality assurance for health care of the elderly rather than of education, Fink et al. (1987) used an expert consensus approach to choose seven conditions from an initial list of 42. Issues of prevalence decided the inclusion of a disease on the initial list, but the final list of seven conditions was chosen by applying indices of (1) significant adverse effects on outcome, (2) beneficial interventions, (3) significant benefit if quality is improved, and (4) the feasibility of monitoring quality of care.

## Methods

Our approach was to use indices similar to those discussed above but to apply them to actual Canadian health data. Our aim was to produce a list of priority health problems for use by curriculum planners at McMaster University. The indices chosen are indicated in Table I. The rationale for the scoring system criteria is discussed below.

Table I. Scoring system for Priority Illness Conditions

| Index | Score | |
|---|---|---|
| M | 2 | Incidence >50/100 000 population/year |
| Magnitude | 1 | Incidence between 5 and 50/100 000/year |
| | 0 | Incidence <5/100 000/year |
| *OR* | | |
| | 2 | Prevalence >3% of population |
| | 1 | Prevalence between 0.03% and 3% of population |
| | 0 | Prevalence <0.03% of population |
| C | 2 | One-year case-fatality rate >3% |
| Case-fatality | 1 | One-year case-fatality rate between 0.03% and 3% |
| | 0 | One-year case-fatality rate <0.03% |
| Q | 2 | Level of remaining quality of life <30% |
| Quality | 1 | Level of remaining quality of life between 30% and 70% |
| | 0 | Level of remaining quality of life >70% |
| T | 2 | Duration of deviation from health >10 days |
| Time | 1 | Duration of deviation from health between 3 and 10 days |
| | 0 | Duration of deviation from health <3 days |
| U | 2 | Delay allowable before the implementation of the intervention <6 hours |
| Urgency | 1 | Delay allowable before the implementation of the intervention between 6 and 48 hours |
| | 0 | Delay allowable before the implementation of the intervention >48 hours |
| P | 2 | The preventive measure is both available and applicable |
| Prevention | 1 | The preventive measure is available but not applicable |
| | 0 | The preventive measure is neither available nor applicable |
| D | 2 | The diagnostic process is both accurate and applicable |
| Diagnosis | 1 | The diagnostic process is accurate but is not applicable |
| | 0 | The diagnostic process is neither accurate nor applicable |
| R | 2 | The intervention is both efficacious and applicable |
| Therapy | 1 | The intervention is efficacious but is not applicable |
| | 0 | The intervention is not efficacious |

***Magnitude of the burden of illness***

The magnitude is measured by the incidence or prevalence of the disorder. When both estimates are available and reasonably accurate, the estimate giving the higher score for this criterion is used, to be sure that no priority problems are missed.

The rationale for the incidence figure of '50/100 000/year' is as follows: assuming that the average family doctor in Canada cares for approximately 2000 patients, and that an illness condition can be classified as a priority if the doctor encounters it at least once per year, then a frequency of one diagnosis per 2000 patients per year converts to 50/100 000/year, and the illness is assigned a magnitude weighting of 2. Decreasing the frequency by one order of magnitude means that the doctor would encounter this diagnosis once every 10 years; averaging this across diagnoses gives an average span of 5 years, which converts to 5/100 000/year and a magnitude weighting of 1. A weight of 0 is assigned to conditions less frequent that 5/100 000/year.

For the prevalence scores, a value of 2 is assigned to a condition affecting 3% or more of the population, based on the assumption that this figure translates to approximately 60 patients affected in an average general practice patient population of 2000 patients. A weight of 1 is assigned to conditions having a prevalence two orders of magnitude below 3% (i.e. 0.03% or less than one patient in average general practice), and a weight of 0 is assigned to conditions having a prevalence of less that 0.03%.

***One-year case-fatality rate***

A one-year case-fatality rate (CFR) of 3% is considered to be significant for the Canadian health care system, and is accordingly assigned a weight of 2. A weight of 1 is assigned to a CFR two orders of magnitude less (0.03%), and a weight of 0 to a CFR less than 0.03%.

***Level of remaining quality of life***

This is the most difficult index to calculate with accuracy, since in most instances data are not available concerning quality of life after an illness begins. Thus, in most cases, the weighting assigned to this criterion will represent the 'best estimate' of the clinicians who provide care for these conditions. In spite of the inaccuracy of this weighting, however, the authors believe that this criterion is important enough to qualify for a separate weighting from the other criteria, since the quality of life issues which have been discussed in the literature in the last several years (Wilkins & Adams, 1983) are of vital importance in understanding the priority of an illness. This index score is based on dividing quality of life into thirds (roughly), with 70% or greater having a weight of 0 (i.e. least important, since intervention makes the least difference here), 30-70% a weight of 1, and less than 30% a weight of 2.

***Duration of the deviation from health***

A duration of 10 days or more of 'less than good health' is assigned a weight of 2. It may

seem that the cut-off point of 10 days is quite short, but when this criterion is combined with a deviation from health (index Q) of 2 (i.e. less than 30%), it may be seen that such conditions would not be tolerated when appropriate diagnosis and treatment are available. A weight of 1 is assigned to durations of 3 to 10 days, since most minor of self-limiting conditions in Canada have this duration, and a weight of 0 is assigned to durations of less than 3 days.

***Urgency of the illness condition***

When intervention is required within 6 hours to maximize the chance of returning to previous levels of health (e.g. in an acute myocardial infarction), a weight of 2 is assigned. If the intervention may be postponed for up to 48 hours (e.g. otitis media), a weight of 1 is assigned, and if the intervention may be postponed longer than 48 hours (e.g. uncomplicated peptic ulcer), a weight of 0 is given. These weightings reflect the opinion of medical educators that medical education must give emphasis to those urgent situations where intervention is rapidly required and the doctor does not have time to search for information about diagnosis and management in textbooks or journals, but must have this knowledge at his or her fingertips (Chong et al., 1984).

***Prevention: availability and applicability***

The term 'availability' is defined as the existence of a preventive measure (or measures) which is applicable at the community or primary care level and for which published evidence exists for preventing the occurrence or in lessening the severity of the illness. If a measure is available, a score of 1 is assigned. 'Applicability' involves the components of 'community effectiveness' as used in the Measurement Iterative Loop, and considers provider compliance with recommended preventive measures, patient compliance with these measures, the availability of facilities for delivering the intervention (e.g. personnel, equipment, etc.), and an overall measure of the effectiveness of the intervention. When a measure is both available and applicable, a score of 2 is assigned.

***Diagnostic process: accuracy and applicability***

'Applicability' is defined in a fashion analogous to that above, determining whether providers and patients comply with the diagnostic process and whether personnel and equipment necessary to make the diagnosis are available to all in the community. 'Accuracy' refers to a diagnostic test, which, under the conditions in which it is usually used (i.e. primary, secondary or tertiary care), has a positive predictive value of 90% or greater or a positive likelihood ratio of 6 or greater. Of major importance for the level of positive predictive value is the usual prevalence of the disorder in the community (Sackett et al., 1985), so that some diagnostic tests are not useful in primary care settings where the prevalence of most disorders is lower than the prevalences found in the referred populations of secondary and tertiary care settings. A score of 1 is assigned if a diagnostic process is accurate, but not applicable. A score of 2 indicates satisfactory accuracy and applicability of such a process. The score 0 indicates that a given process is neither accurate nor applicable.

***Intervention in established cases: efficacy of the intervention***
While 'Applicability' has been addressed, 'Efficacy' defines an intervention which has been shown to produce more good that harm for the patients to whom it is applied under ideal circumstances of high patient and provider compliance. Where possible, an efficacious intervention is defined as one which yields an outcome of more than 90% of the premorbid quality of health. A score of 0 is assigned to a non efficacious intervention. An efficacious intervention sores 1; an intervention that is both efficacious and applicable scores 2.

## Development of Priority Illness Conditions (PIC) table

Following the development of prioritisation schema, we tested its validity by comparing it with the list of priority problems generated by the clinical teachers in the PPCQ questionnaire (Chong et al., 1984). In order to have information to analyse with the PIC schema, we collected data from a variety of sources:

1. Eight local general/family practice groups, with a combined patient population of over 56.000 patients, provided one year's worth of patient encounter data in the form of diagnoses made by the doctors and other health care providers; four of these groups were teaching practices of the McMaster University Department of Family Medicine.
2. Four local teaching hospitals contributed one year's worth of data on hospital separations (i.e. discharge diagnoses).
3. Provincial and national survey and institutional data were obtained from publications provided by the Ontario Ministry of Health, the Canada Health Survey, and Statistics Canada.
4. For the purposes of this study, the 'community of interest' was taken to be the Regional Municipality of Hamilton-Wentworth, and the most recent census data were obtained so that rates of specific conditions could be extrapolated.

One of the major difficulties in incorporating these data into the PIC prioritisation scheme was the lack of standardization of coding systems, making comparisons between sites and levels of care hazardous. For example, the hospital data were either in the form of ICD-9 codes or the Ontario Broad Code format (a subset of ICD-9). The data from community family practices were in the form of ICHPPC codes, another subset of ICD-9 more appropriate to primary care. Thus, some editing of the data to fit the needs of the PIC schema as well as the educational needs of medical students was necessary. The result of the application of the priority-setting method to the raw data obtained was the Priority Illness Conditions table (PIC table), a portion of which is reproduced in Table II.

The priority health problem (PHP) weighting score for each condition is simply a summation of the other scores. The table is divided into three sections: index M, the magnitude; indices C (case-fatality rate), Q (quality of life) and T (duration of the condition) which may collectively be called the 'severity' of the condition; and indices U

## Table II. Priority Illness Conditions for medical education

| Illness conditions | Priority Health Problem Indices | | | | | | | | Severity score | Effectiveness score | Priority Health Problem weighting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | C | Q | T | U | P | D | R | C + Q + T | U+P+D+R | |
| *Priority problems* | | | | | | | | | | | |
| *Common problems* | | | | | | | | | | | |
| Cardiac arrhythmias | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 5 | 7 | 14 |
| Ischaemic heart disease | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 5 | 7 | 14 |
| Burns | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 8 | 13 |
| Asthma | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 4 | 7 | 13 |
| Alcohol abuse | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 1 | 5 | 6 | 13 |
| Malignant neoplasm (skin) | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 5 | 6 | 13 |
| Malignant neoplasm | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 6 | 5 | 13 |
| Sexually transmitted diseases | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 8 | 12 |
| Thrombophlebitis | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 7 | 12 |
| Valvular heart disease | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 4 | 6 | 12 |
| Seizure disorder | 2 | 1 | 1 | 2 | 2 | 0 | 2 | 2 | 4 | 6 | 12 |
| Congestive heart failure | 2 | 2 | 1 | 2 | 1 | 0 | 2 | 2 | 5 | 5 | 12 |
| COPD | 2 | 2 | 1 | 2 | 0 | 2 | 2 | 1 | 5 | 5 | 12 |
| Fractures/Dislocations | 2 | 0 | 0 | 2 | 2 | 1 | 2 | 2 | 2 | 7 | 11 |
| Helminth/Pediculosis | 2 | 0 | 0 | 2 | 1 | 2 | 2 | 2 | 2 | 7 | 11 |
| Prenatal care | 2 | 1 | 0 | 2 | 0 | 2 | 2 | 2 | 3 | 6 | 11 |
| Abdominal pain NYD | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 2 | 3 | 7 |
| Menopausal syndrome | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 2 | 7 |
| Anxiety | 2 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 2 | 7 |
| Acne/Seborrhoea | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 2 | 6 |
| Irritable colon | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 3 | 1 | 6 |
| Myalgia/Arthralgia NYD | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 2 | 5 |
| Acute URI | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 2 | 5 |
| Chronic rhinitis | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 2 | 1 | 5 |
| *Uncommon problems* | | | | | | | | | | | |
| Schizophrenia | 1 | 2 | 2 | 2 | 2 | 0 | 2 | 1 | 6 | 5 | 12 |
| Glaucoma | 1 | 0 | 2 | 2 | 2 | 0 | 2 | 2 | 4 | 6 | 11 |
| Viral hepatitis | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 4 | 6 | 11 |
| Encephalitis | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 6 | 4 | 11 |
| Tuberculosis | 1 | 1 | 0 | 2 | 0 | 2 | 2 | 2 | 3 | 6 | 10 |
| Affective psychosis | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 2 | 5 | 4 | 10 |
| Deficiency anaemias | 1 | 0 | 0 | 2 | 0 | 2 | 2 | 2 | 2 | 6 | 9 |
| Chronic skin ulcer | 1 | 0 | 1 | 2 | 0 | 2 | 2 | 1 | 3 | 5 | 9 |
| Pertussis | 1 | 1 | 0 | 2 | 1 | 2 | 1 | 0 | 3 | 4 | 8 |
| Infertility | 1 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 3 | 3 | 7 |
| Hypertrophy of tonsils | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 2 | 4 | 7 |
| Scoliosis | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 1 | 3 | 3 | 7 |
| *Rare problems* | | | | | | | | | | | |
| Malaria | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 8 | 12 |
| Typhoid | 0 | 2 | 0 | 2 | 2 | 1 | 2 | 2 | 4 | 7 | 11 |
| Meningitis | 0 | 2 | 2 | 2 | 2 | 0 | 1 | 2 | 6 | 5 | 11 |
| *Non-priority problems* | | | | | | | | | | | |
| Reye's syndrome | 0 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 5 | 3 | 8 |
| AIDS | 0 | 2 | 2 | 2 | 0 | 1 | 1 | 0 | 6 | 2 | 8 |
| Diverticulosis | 1 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 3 | 6 |
| Thalassaemia | 0 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 5 | 1 | 6 |
| Ganglion | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 2 | 5 |
| Porphyria | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |
| Infectious mononucleosis | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 3 |

(urgency), P (preventability), D (diagnosability) and R (treatability), which may collectively be called the effectiveness of intervention' scores. Thus, conditions are separated into priority and non-priority categories. The following arbitrary decisions were made to facilitate this process.

All conditions with a magnitude score of 2 were called 'common', and as such were designated as high 'priority'. The rationale for this was that all undergraduate medical students, regardless of their eventual specialization, needed to be aware of the magnitude, severity and effectiveness of intervention for such conditions. Conditions with a magnitude score of 1 were analysed further. To be designated a priority problem, an uncommon problem had to achieve either a severity score equal to one-half the full score for this section (i.e. 3 out of 6) or an effectiveness score equal to one-half the full score for this section (i.e. 4 out of 8). In effect, the condition, through uncommon, becomes a priority by virtue either of its severity in those affected or of the effectiveness with which health professionals may intervene. For example, pertussis becomes an educational priority by virtue of its magnitude (1 out of 2) and its severity (3 out of 6) and its effectiveness of intervention (4 out of 8); by contrast, infectious mononucleosis, with a magnitude of 1, has a severity score of 2 and an effectiveness score of 0, which gives it the status of a non-priority problem from an educational viewpoint. Finally, 'rare' conditions (those with a magnitude score of 0) had to meet the half-marks rule for both severity and effectiveness to be considered a priority problem. For example, typhoid has a severity score of 4 out of 6 and an effectiveness score of 7 out of 8, making it a priority; porphyria, although severe (5 out of 6), has a low effectiveness score (0 out of 8), making it a non-priority problem.

Following the division of the PIC table conditions into priority and non-priority categories, comparison with the teacher survey of 1984 (Chong et al., 1984) revealed substantial agreement between the two lists. Common, severe problems for which effective interventions exist, such as ischaemic heart disease, burns, and asthma, were clearly high priorities when assessed either by a method dependent on analysis of health data or by a consensus of clinical teachers. Similarly, conditions of lower prevalence and severity, for which interventions are of limited or questionable value, were considered to be of low educational priority by both approaches. Of greatest interest were those conditions which the teachers felt were priorities but which did not appear in the PIC table; among these were spontaneous abortion, premenstrual syndrome and osteoporosis. Also of interest are health problems and conditions which one might believe should be educational priorities but which appear neither in the PIC table nor in the teacher survey; such conditions might include deficient nutrition of the elderly, smoking, and immobilization following accidents or surgery. Possible reasons for these discrepancies will be discussed in the following paragraphs.

## Discussion

The approach to priority setting in medical education described in this paper can be a method for stimulating students to internalize broad approaches to thinking about each patient's individual clinical problem in population and societal perspectives, in addition to learning basic mechanisms/pathophysiology. In particular, the concepts embodied in the Measurement Iterative Loop are useful for the analysis of health problems in a broader context, whether for curriculum development, for planning the allocation of research resources, or in health policy planning. The questions which educational planners at each medical school must answer are: 'To what extent should students at this medical school be aware of concepts of population health? How can medical students best learn the knowledge and skills of a population-based approach to medical education? If a population-based approach is a priority, how and where can we fit the requirements for this educational approach into our already overcrowded curriculum?'

There are a number of ways in which educational priorities can be set. The first is the method of fiat, whereby one or a small number of powerful academic staff members hold absolute control over what is taught in the curriculum. This outmoded method of curriculum development has virtually disappeared.

The second method is that of 'expert' consensus; this is the method of the curriculum committee. The problem with this method in setting educational priorities for population health is that few members of the usual curriculum committee know enough about issues of population health. To gain a broader perspective about these issues, particularly the unmet health needs in a population, a curriculum committee should include health services researchers (Fink et al., 1987).

A third method of priority setting may be accomplished by survey. It is possible to survey educators concerning their beliefs about educational priorities, and then use these results to influence the curriculum. This approach was taken at McMaster University in 1984 when the Priority Problems and Conditions questionnaire was sent to all teachers who taught clinical clerks. The teachers were asked to rate a number of health problems with which they would normally be concerned in their specialties on six scales:

1. Prevalence - the degree to which the problem or condition is common in patient care settings.
2. Clinical Logic - the degree to which the problem has important value for clinical problem-solving.
3. Prototype Value - the degree to which the problem or condition, although rare, is an excellent model for study.
4. Urgency - the degree to which immediate intervention is required at the time of presentation.
5. Treatability - the degree to which there is sound evidence that an intervention, either

preventive, therapeutic, or rehabilitative, does more good than harm.
6. Interdisciplinary Input - the degree to which the condition may be suitable for promoting the study of concepts from a range of disciplines.

The high response rate and high degree of consensus were taken to indicate considerable agreement among the clinical teachers as to what does, and what does not, constitute an educational priority for medical students.

It is also possible to consider educational priorities form the perspective of medical students. In January 1987, in the 12-week block of the McMaster curriculum entitled 'The Life Cycle' which immediately precedes the clerkship, students were asked to seek out patients, preferably in community settings, from whom a history was elicited and on whom a physical examination was performed if possible. They were then to examine the patient's problem in the light of aspects of population health, and report to their tutorial group about their findings, conclusions, and opinions on how medical care should change to serve better the needs of patients with that particular condition. A series of modified essay questions based on the steps in the Measurement Iterative Loop guided the students' analysis of the population health issues regarding their patients' illnesses. The health problems sought out by the students, while inevitably influenced by patient availability, still form an index of the educational priorities of the students themselves. This information about medical students' educational priorities is of considerable importance in a medical school which emphasizes self-directed learning.

The fourth method, which forms the basis for this report, is to use existing or newly generated health care data to set educational priorities. In developed countries, a great deal of data concerning health and health care exist at a variety of levels - national, state/provincial, and local. They are collected from primary care/family medicine levels within the health care system as well as from secondary and tertiary care hospitals and other institutions. It is important also to examine the accuracy, timeliness, and usefulness of this information in educational planning. In countries where health data are of limited quality, innovative approaches to the generation of new data have been tried. As part of their community education activities, medical students have carried out household surveys to collect information on unmet health needs in Egypt (Hassan, personal communication, 1987); in Indonesia, students in a community-oriented medical education programme investigate local health problems, and are given some voice in policy-making at the level of the district health center (Sanusi, personal communication, 1987). These are but two examples of how medical education can include an awareness of the health needs of the community.

The importance of observing both the patients who seek care and the doctors who provide care must also be kept in mind. An inquiry into the doctor's tasks, work-load and case mix will also be helpful in determining educational priorities. Similarly, if the term 'population

health' is to be used to describe educational priorities, then it must be clear what is meant by a population in this context. Populations are usually defined geographically. However, there are many population subgroups within one geographically defined population - for example, the elderly, ethnic groups, and workers (Harper, 1986). A population may also be defined as the individuals who consider a certain doctor or group of doctors as 'their' main health care providers. In this sense, the population is the denominator of a practice; this can be very useful for determining rates of health problems and conditions when the denominator is known or can be estimated accurately (Cherkin et al., 1982). However, this approach will miss the 'unmet' needs of a population as those in greatest need may not be able to access these health care providers.

One of the major problems with the priority-setting method developed here is its reliance on diagnostic labels. Data are all-too-frequently only classified as diagnoses such as emphysema, rather than recording the health problem or risk (e.g. smoking, occupational hazards) that leads to the diagnosis. Thus, an approach to priority setting which deals only with diagnoses will miss much of the richness of causal factors related to the health problem being evaluated. In addition, many health databases record patient visits only, so that a small number of patients who make many visits for the same problem would skew the data towards that diagnosis and falsely elevate its magnitude. It becomes important to define the concept of an episode of care, wherein a patient-diagnosis combination is followed through all of the encounters made for that diagnosis. The recently proposed International Classification of Primary Care (ICPC), which includes a Reason for Encounter classification, incorporates methods for defining such an episode of care. In the future the ICPC may form a better underpinning for health care data from the primary care level (White, 1985).

Frequently, medical students are unfamiliar with searching for population-specific health data, and it may be of value in the introduction of population health concepts to make available to the students a collection of national, state/provincial and local health data, a guide to health need assessment (Chambers et al., 1983), and population statistics such as local census data in a small reference library. This could avoid student complaints of inordinate amounts of time spent tracking down the data needed for an understanding of population health. Also of use would be reports of the distribution of diagnoses and health problems in previously published studies (e.g. the Canada Health Survey (Statistics Canada, 1987) and the National Ambulatory Medical Care Surveys in the USA (Hoermann, 1973; Gagnon *et al.*, 1982)).

It is likely that for students to embrace and understand fully the kind of critical thinking involved in population health and Iterative Loop concepts, a major degree of reinforcement must come from the postgraduate students, and from full-time and part-time teachers who act as mentors and role models to the students. Many of these mentors may be completely unfamiliar with the concepts, let alone have had any experience applying them. Teaching

staff committed to the introduction of population health concepts into the curriculum must explore educational programmes and incentives for medical teachers to learn and become comfortable with the concepts of population health, and to pass on to their students an enthusiasm and respect for these issues that are encountered in day-to-day patient care, as well as in tutorials and lectures.

This report has focused on the teaching of population health to medical undergraduates. The concept may be extended to other levels of medical education, including postgraduate training and continuing medical education (CME). Indeed, positive outcomes for this type of training would become visible and measurable sooner when applied to more advanced levels of medical education. Alger and colleagues have used the concepts of population health at the CME level to design an educational programme in cancer prevention for primary care doctors in New Jersey (Alger, personal communication, 1987).

Clearly, the schema outlined in Table I for judging the educational importance of an illness or condition represents an ideal towards which to strive, rather than a *fait accompli*. In developed countries at least, data on incidence, prevalence and case-fatality rate are generally available and of reasonable quality. However, data on quality of life following an illness, the accuracy and predictive value of diagnostic tests under varying circumstances, the efficacy of various preventive, therapeutic and rehabilitative measures, and other indices of the priority of an illness are currently being investigated and debated. This need not preclude using the health data we have in priority setting; however, it must remind us to be cautious in evaluating the outcome of such a prioritisation exercise, and to continue to search for more and better data to feed into the priority-setting equation.

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# The Network of Community-Oriented Educational Institutions for Health Sciences

## Network mission statement

The Network is a global association of institutions for education of health professionals committed to contribute, through education and research, to the improvement and sustainment of health in the communities they serve.

Network member institutions seek collaboration with health systems to adapt the education of health personnel and health services to better serve the aim of improving the health of the community. Network members also explore innovative educational approaches (e.g. community-based education, problem-based learning) to fulfill this mission. The Network emphasizes educational research, research on priority health needs, and on the efficacy of health services to guide these developments. The Network also invites the collaboration of like-minded organizations.

## Network objectives

(in the area of education)
To promote the creation of curricula for the training of health personnel adapted to the priority health needs of the community to be served (e.g. community-oriented education) and to develop educational methods allowing students to concentrate on the acquisition of knowledge, skills, and attitudes relevant to that context (e.g. community-based education and problem-based learning).

(in the area of health services)
To establish collaboration among educational institutions for health personnel in cooperation with communities, health services and related sectors to promote the development of model health systems, serving those communities and to include promotion of their suitability for the community-based education of students and the accommodation of graduates as professionals.

(in the area of research)
To focus research on the identification and alleviation of priority health problems of the communities to be served and on the effectiveness of health services provided in relation to the health needs already determined.

**The future of the Network**

The Network seeks to initiate and support various activities to fulfill its aims. Activities are being undertaken to implement most of the strategies listed below; and in the near future emphasis may shift in the light of new opportunities or challenges. The 1995 WHO resolution on "Reorientating medical education and medical practice for health for all" may for example prompt the Network to pay even more attention to its relation with health services.

The *strategies* of the Network are to promote:
(in general)
- opportunities for exchange of information among the membership e.g. in publications and at (scientific) meetings.
- formation of partnerships among members for specific purposes (e.g. in bi- or multilateral linkages or in regional networks)
- active cooperation with like-minded organizations

(in the area of education)
- representation of priority health problems of the community in curricula for education of health personnel.
- training in relevant health professional skills throughout the curriculum (expanded by or including problem-solving skills, communication skills, health education, teamwork, leadership skills, critical appraisal of evidence, etc.).
- training of students for independent, life-long learning.
- intra-curricular opportunities for students to study health problems within community settings.
- dissemination of educational concepts matching the above goals e.g. problem-based learning, problem-oriented education, case studies, skills training programmes, community-based education, and corresponding approaches to relevant student assessment.

(in the area of health services)
- exchange of information with organizations developing global policies with respect to health promotion and provision of health care.
- cooperation between member institutions and the corresponding regional and national health systems.

(in the area of research)
- evaluation of innovative educational programmes to assess the effects of their implementation in conjunction with the above goals and their contribution to improving health.

- research relevant to the study of health promotion and community priority health problems.
- involvement of students in research activities as specified above.
- collaboration with relevant international scientific organizations.

**Membership of the Network**

Institutions as well as individuals may apply for Network membership, which includes the following categories:

- *Full membership* which can be acquired by educational institutions for health sciences, providing community-oriented training and willing to collaborate with other institutions in achieving the goals of the Network. Application for full membership can only be filed by an associated member. Full members have voting rights.
- *Associate membership* which can be acquired by institutions, organizations or groups of people interested in the objectives of the Network and the activities ensuing from them and who wish to play an active role in them. Associate members cannot vote.
- *Corresponding membership* which can be acquired by individuals who are interested in the fulfillment of Network objectives. Corresponding members cannot vote.
- *Honorary membership* which will be granted to individuals who have rendered exceptional service to the Network. Honorary members cannot vote.

Enquiries should be addressed to: Office Network of Community-Oriented Educational Institutions for Health Sciences
P.O. Box 616
6200 MD Maastricht
The Netherlands
Tel.: 31-(0)43-3881522/1524
Telefax: 31-(0)43-3670708
Email: secretariat@network.unimaas.nl

# Leadership for Change in the Education of Health Professionals

The Network publication "Leadership for Change in the Education of Health Professionals", ISBN 90-73026-06-7, by Victor Neufeld, Sumedha Khanna, Linda Bramble and Janice Simpson, can be ordered at the Office of the Network of Community-Oriented Educational Institutions for Health Sciences, P.O. Box 616, 6200 MD Maastricht, The Netherlands.

The price of the book is Dfl 60,= (approx. US $ 30*)
Mailing and handling is Dfl 25,= (approx. US $ 12,50*)

* Price level: 1997.